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Exceeds Ton of Sheets Per Minute

Armco Continuous Mill at Ashland Is Epoch-Making As to Productivity and Unique in Incorporating Rolling Principles Established by Special Research

FROM the ingot to the sheet by a continuous process! Such a method of manufacturing sheets is in regular operation by the Ashland, Ky., division of the American Rolling Mill Co.

The result of special tests and studies of the phenomena of sheet rolling, carried on at various times since the beginning of the World War, it represents determination to do by mechanical means what had been done by hand with little or no change of consequence since the conventional method of making a sheet got its start in about 1750. Intensively but

quietly developed in the last three to four years, sheets were being made at the moment of writing at a rate of over 1 ton a minute. Capacity for the present is put at 1400 tons per day, the plant taking care of some 720 tons of ingots bloomed in a 10-hr. shift.

On the following pages, the plant is considered from two angles. First is given at some length the scientific or engineering basis of the system. Then is illustrated and described the equipment embodying the ideas, as well as typifying the inventive resources, of the Armco organization.

Scientific Basis for the Method of Rolling

IN the investigation of the fundamental factors involved in rolling sheets, it was early recognized that when a sheet passes through a pair of rolls conditions are changed from those which exist without a sheet in the rolls. The studies made necessary the creation of new terms to describe adequately the conditions, whereupon the name "active pass" was adopted to describe "the space between the rolls while they are in engagement with the piece being rolled there between." In addition, it was essential to meas-

ure the temperatures of the revolving rolls as well as of the material being worked, and also to measure the sizes of rolls in micrometer measurements.

The universal belief had been that in order to roll sheets successfully, the rolls, while the sheet is passing through, must be as nearly a true cylinder as possible. The experiments revealed, on the contrary, that a true cylinder cannot possibly roll wide, thin sheets. In fact, analysis of the old Welsh process showed that the active passes were not always such that the rolls



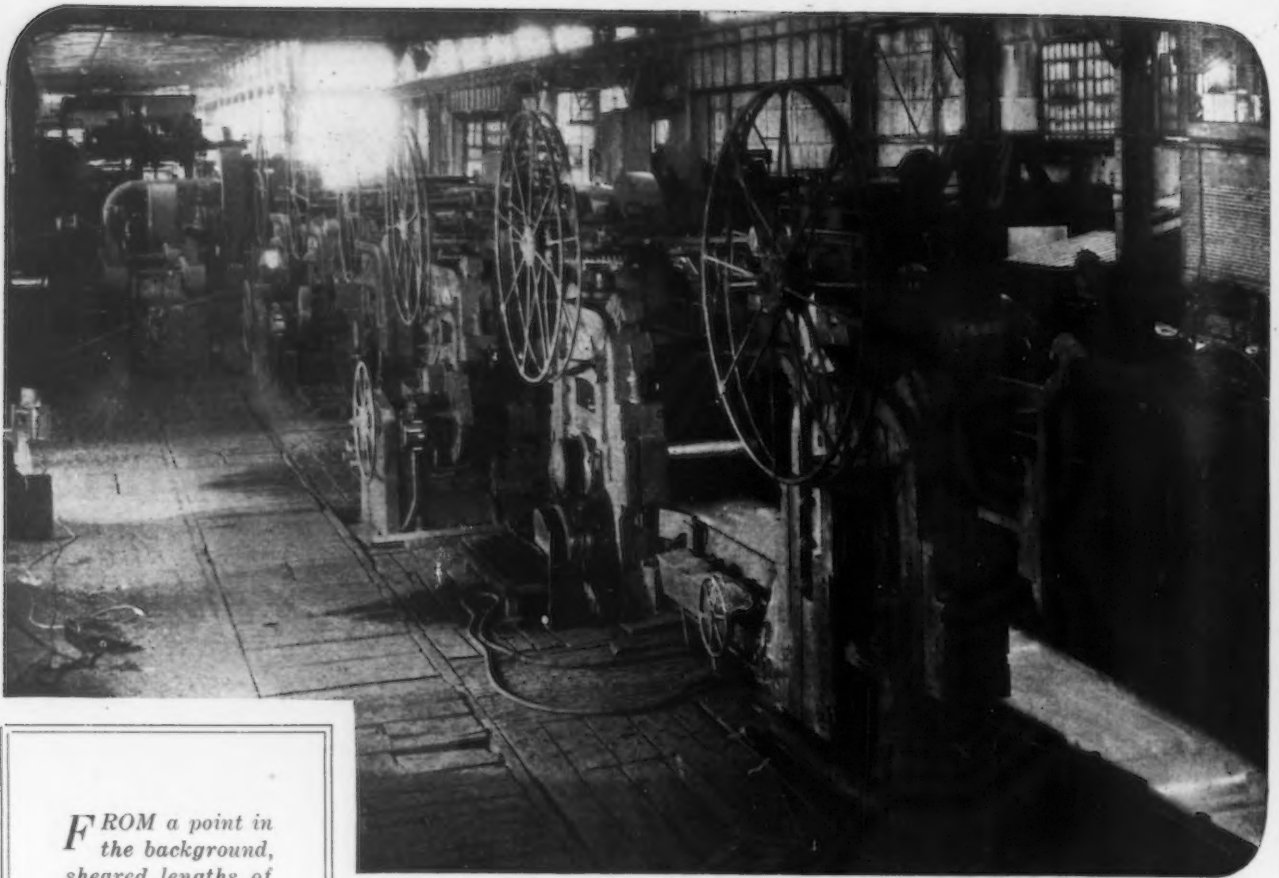
INGOTS 19x39 in. in section are reduced to 4-in. slabs, 36 in. wide and 23 ft. long. Run-out of blooming mill carries the slabs to seven 2-high mills operated in tandem, which reduce to a 7/16-in. bar-plate, so-called, and then, to a second group of seven mills, which reduce to rough plates or sheets of an average of No. 13 gage.



THE rough plates are reduced to sheets by passing in packs of matched pairs through five 3-high stands, with reheating furnaces placed as indicated and calculated to maintain proper rolling temperatures and sufficiently loose rolling to prevent so-called stickers. The product is commonly No. 20 gage, 41 in. wide.



THE sheets are then given a continuous strip annealing and pickling operation. Side trimmers and two cut-off shears in tandem prepare the sheets for a stitching machine, which staples the sheets into a continuous ribbon. This is passed in succession through annealing furnace, cooling hood, pickler and then to shears for cutting out the overlapped splices and delivered finished sheets.



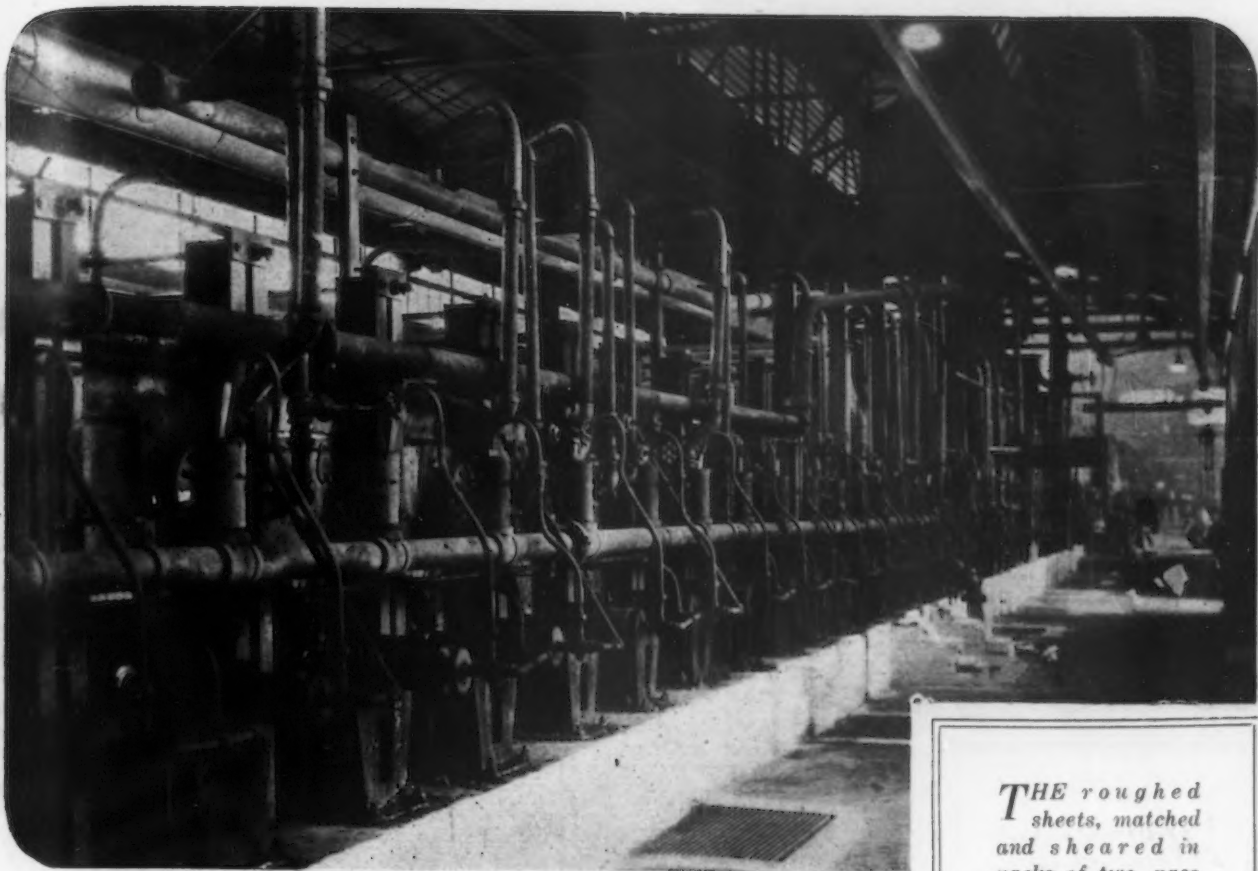
FROM a point in the background, sheared lengths of the slab on the blooming mill run-out come through these stands as bar plate

were truly cylindrical. Although tradition had dictated that the rolling of sheets must be performed on only one set of rolls, which were supposed to give their particular shape to the piece or pack, the discovery was made that the best controlled active passes were those in which the shape of the piece in the roll differed from the shape before entering it. This revelation led immediately to the adoption of the system of control which has removed to a large degree the limitations in width and thinness, which had formed the stopping place of continuous rolling processes in the past.

IN these seven stands, the bar plate, 7/16 in. thick, is rolled into Nos. 13 to 16 gage sheets

The basis for the new development lies in the control of the various factors going into the formation of the active pass, so that a piece is rolled with a slight convexity and each active pass following the other cuts down the con-





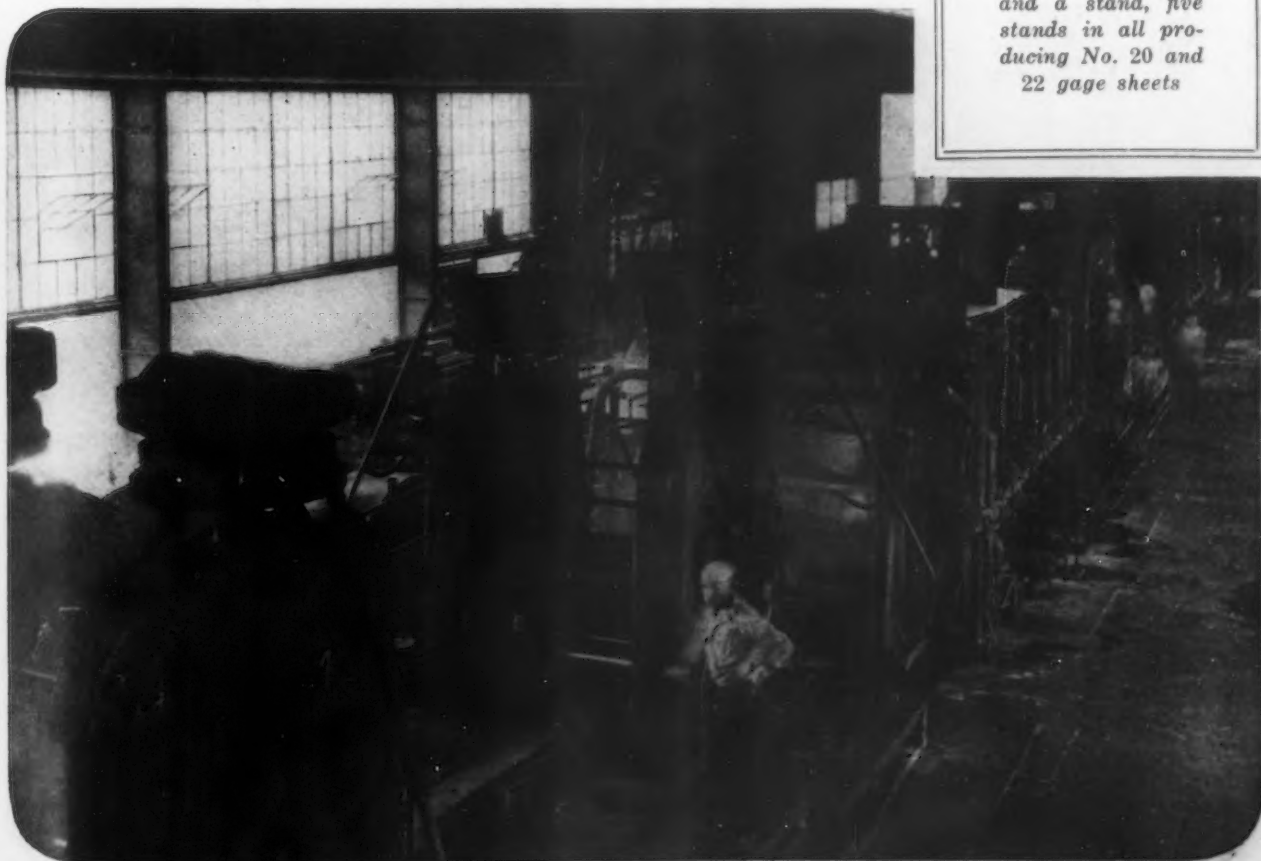
THE roughed sheets, matched and sheared in packs of two, pass through this continuous furnace for the final hot rolling

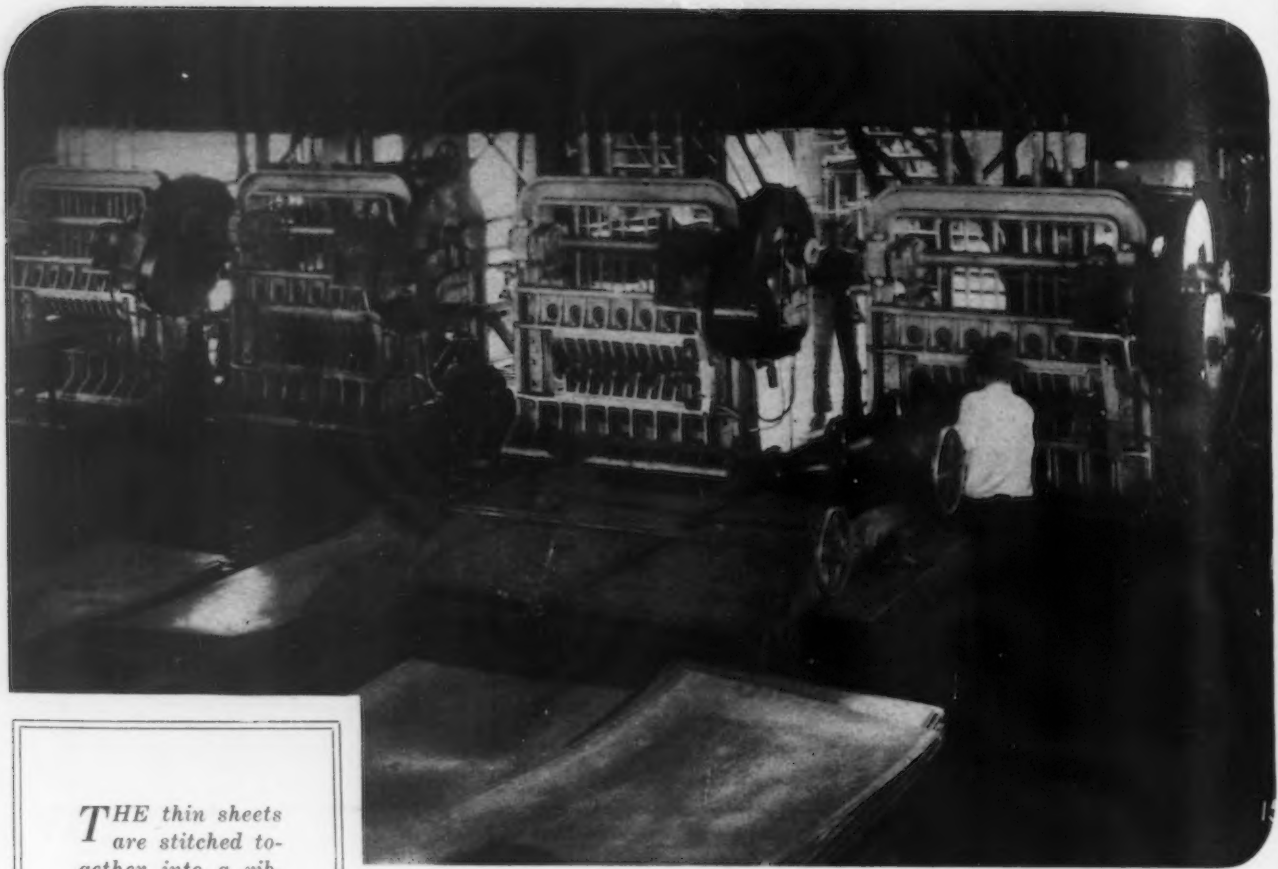
vexity and gives to the piece surfaces more nearly approaching parallelism.

The need for using side guides to feed a thin, wide piece of metal is done away with by this control, because the rolling of slight convexity into the piece, which is preserved but reduced in each pass, forces the piece to travel through the roll stand in a straight line, as if in a closed pass. If the active passes were truly cylindrical, the piece would tend to travel toward the necks in a manner which side guides are entirely inadequate to control, because of the thin, wide nature of the product being formed.

In the rolling of narrow strips on a strip mill, there is little difficulty in guiding the material, but as the width of the sheet increases, these difficulties become much greater.

BEYOND the continuous furnace are first two stands and then alternately a reheating furnace and a stand, five stands in all producing No. 20 and 22 gage sheets





***T**HE thin sheets are stitched together into a ribbon for continuous passage through the annealing and pickling apparatus*

***B**ETWEEN the stitcher and the annealing furnace the ribbon of sheets is held in loops to take up slack on the feed into the furnace*

Factors entering into the development of the new process are the prepared contour, temperature, composition, springiness and spacing of the rolls, and the shape, composition and temperature of the piece being rolled. By proper regulation of these elements provision is made for the production of a piece in each stand of rolls which has a convex contour which is slightly more convex than the resultant active pass of the next stand of rolls, considering each active pass in the series as a resultant of the factors outlined. Thus the process consists in first determining the diameter of the rolls and their physical structure, and in cutting their surfaces with a concavity, in one or both rolls of each pair, which at a given screw (or spacing of the rolls), temperature, thickness and contour of the piece will give a resultant convexity of active pass when



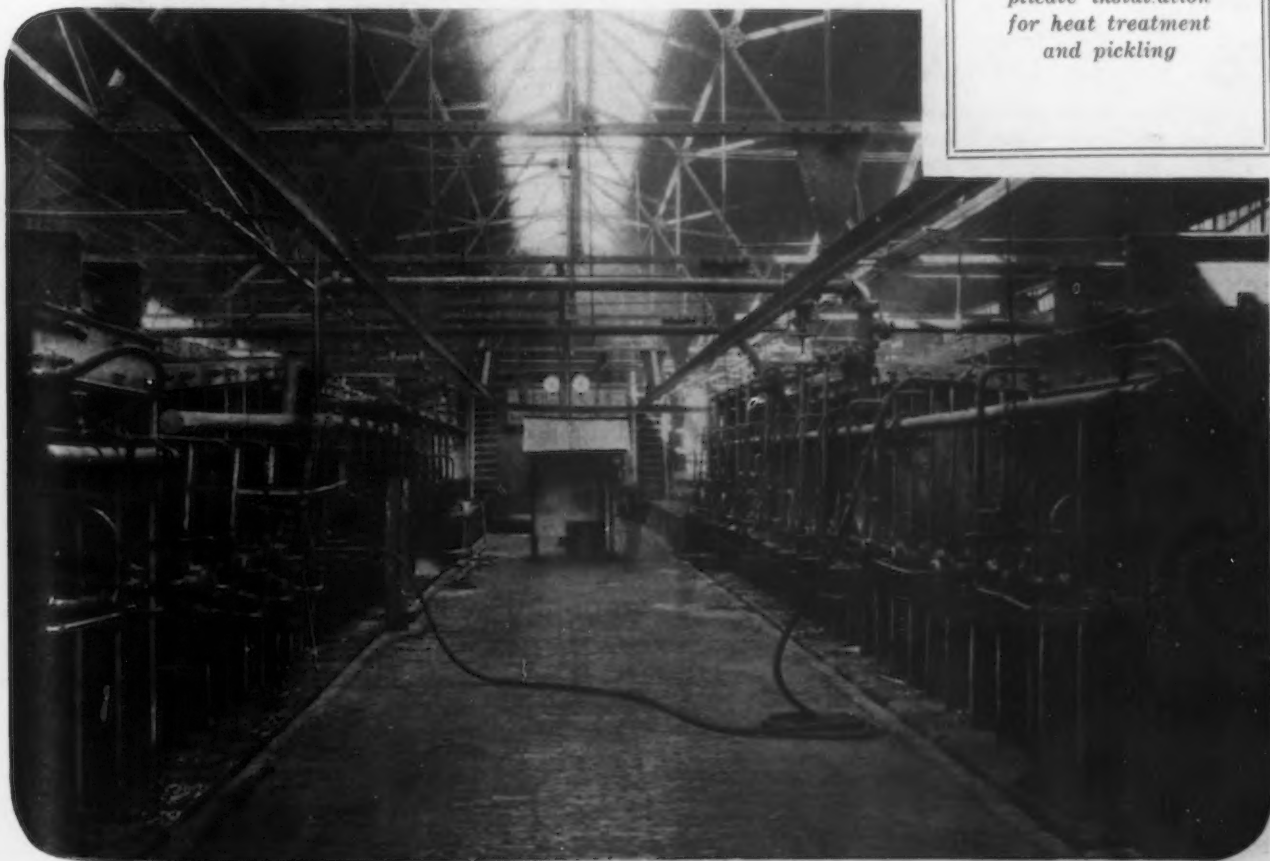


the piece is between them. Temperature of the rolls is controlled by external means and temperature of the piece by furnaces or heaters between the stands of the rolls.

In carrying out this process the roller must keep in mind the factors stated. For example, a roller is given a test piece which he knows has a convexity similar to the pieces he is to handle on a single run. He passes this piece through stand after stand of the rolls, and measures the edges and the middle by means of specially designed micrometers. Having run the test piece he gains a setting of his rolls which provides an active pass in each stand which is less convex than the piece delivered to it from the preceding stands. Having set his rolls, he starts the packs (or doubled up body of thin plates) through the stand

AFTER emerging from the pickler the spliced overlaps are cut out by these shears

THE annealing furnaces are equipped with electrical pyrometers and there is a duplicate installation for heat treatment and pickling





In the first rolling operation, the blooming mill table delivers the slab into the holding furnace in the background

without changing them further, except in case of trouble, when he again checks up by gage or by eye for progressively less convexity of active pass. He naturally will be provided with the usual expedients for control of heat on the piece and rolls, control of screw and with knowledge of the starting contour of the pieces he is going to roll.

As a typical analysis of a single instance of the proper mode of reduction the following table is given of dimensions in cross section of a typical pack in three stages of successive reduction in consecutive passes through three stands of rolls. The numerals are in fractions of an inch of thickness and the pack is 30 in. wide.

Starting		After Second Pass	
Edge	0.1875	Edge	0.1146
Middle	0.1965	Middle	0.1201
Difference	0.0090	Difference	0.0055
After First Pass		After Third Pass	
Edge	0.1423	Edge	0.096
Middle	0.1491	Middle	0.1005
Difference	0.0068	Difference	0.0045

All three of the active passes are convex, although the last one shows little difference between edges and middle. In practice, of course, the final gage is a fixed requirement on any one order, as is the arrangement of the active pass in each stand to reduce the

middle more than the edges and still preserve some convexity. Furthermore, the maximum number of passes is a fixed quantity.

Given the starting convexity of the pack, the number of active passes, and the final gage to be rolled, the operators calculate a table similar to that given, although, it is admitted, an absolute and mathematically exact correspondence to the example already given, in the several active passes, is by no means required.

Emphasis is laid on the fact that the pack as it enters and passes each stand will lie smooth and feed accurately through the center of the roll stands, and that this would not be possible unless the roller realized fully the necessity of controlling the factors discussed and unless he also knew the rule of convexity reduction (greater reduction of thicker than thinner parts).

It is upon this basic principle of proportional convexity and its control that the American Rolling Mill Co. has built its Ashland, Ky., plant in which the method of manufacturing steel sheets has been revolutionized and in which has been accomplished in a mechanical manner the work which previously skilled rollers have done by hand in finishing a pack on a single stand of two-high rolls. A detailed description of the plant gives a more intimate conception of how this principle has been successfully applied.

Equipment for Continuous Production of Sheets

OPERATING methods in the open-hearth and blooming mill departments do not differ materially from accepted standard practice. Six open-hearth furnaces, each having a capacity of 100 tons, supply hot metal for the 5-ton ingots, which are 19 x 39 in. in section. The furnaces are heated by coke oven and natural gas. Equipment consists of two low type Alliance chargers, one 600-ton hot metal mixer, two 125-ton Alliance ladle cranes and one 75-ton Alliance hot metal crane. Two new furnaces are under construction at the present time.

Five 4-hole soaking pits, 6 x 8 ft. in size, are located in a building 315 ft. in length, which is served by a 75½-ft. crane. Here coke oven and natural gas also is used. Two 10-ton Morgan charging cranes and an ingot chariot provide facilities for handling and transporting ingots.

The ingot is lifted from the pit by the crane, which carries it to a roller conveyor leading direct to the blooming mill. An alternate plan is to transfer the ingot by a crane from the pit to the ingot chariot, which takes it to the conveyor for delivery to the blooming mill.

On the 36-in. motor-driven blooming mill, the product of the United Engineering & Foundry Co., Pittsburgh, the ingot is reduced to a slab 4 in. thick, 36 in. wide and 23 ft. long. The blooming roll provides for two edging passes. Power for the mill is furnished by a 2500-hp. direct-current variable speed motor, which receives current from a 1500-hp. General Electric motor-generator set.

From the blooming mill the slab goes through a holding furnace 30 ft. in length. As it emerges from the furnace it is sheared and dropped upon a table where, by means of a mechanical guide patented by the company, it is turned 90 deg., so that it is in the position for passage through the successive stands of the continuous bar plate mill, so called.

In this mill there are seven 2-high balanced stands, with 30 x 58-in. rolls and with vertical edgers after a number of the stands. Here the 4-in. slab is reduced to a bar 7/16 in. in thickness. Stands Nos. 1, 2, 4 and 5 each are driven by a 500-hp. Westinghouse motor; No. 3 stand by a 300-hp. motor, and stands Nos. 6 and 7 each by a 600-hp. motor. All motors have a speed of 585 r.p.m. with the exception of the last two,

which have 870 r.p.m., and the reduction in speed is effected through Falk reduction drives. The bar plate leaves this mill at a speed of approximately 280 ft. per min.

Four men operate the entire bar plate mill, three men being stationed on the floor and the fourth in a pulpit from which the stands and the beds are controlled.

From the bar plate mill the bars either are taken on a roller conveyor direct to the jobbing mill immediately beyond or are delivered to the bar plate storage yard to be cut into sheet bars for use in the conventional type of hand mills. The material taking the latter course, as it leaves the mill, is carried by three eccentric strokes by the rack and pinion method from the main conveyor to cooling beds paralleling the conveyor. The bars are then transported mechanically across the cooling beds upon a roller, which delivers them to the storage yard. All of these operations are controlled from a pulpit at one side of the mill. Both the blooming and bar mills are housed in one building 392½ ft. long, served by a 75½-ft. crane.

Continuous with the bar mill is the jobbing mill, into which material for further processing is carried on the main conveyor. At the mill entrance the bar plates pass through a 30-ft. holding furnace in order that they will retain the proper temperature. As they move out of the furnace they are sheared to length at a rate of 30 to 40 a minute, and pass through a train of mills, consisting of four 2-high 30 x 58-in. balanced stands and three 3-high 30 and 14 x 58-in. stands.

After the sheets have gone through the stands in this mill, the roller can ascertain the weight of any sheet by means of a weightograph (manufactured by the Weightograph Co., St. Louis). For the weighing process a given sheet is mechanically lifted from the table so that the progress of the main line of sheets is not interrupted. If the piece which is weighed does not meet requirements, the weigher signals to the pulpit operator in charge of the stands of the mill, who either screws down or loosens the rolls to make the proper adjustments.

At the end of the runout table an automatic piling device has been installed with scales for determining the weight of the product.

By the process just described the bar plates are reduced to a thickness ranging from ¼ in. down to No. 16 gage, with No. 13 gage about the average. The maximum width attained is 48 in., while the average length is about 10 ft.

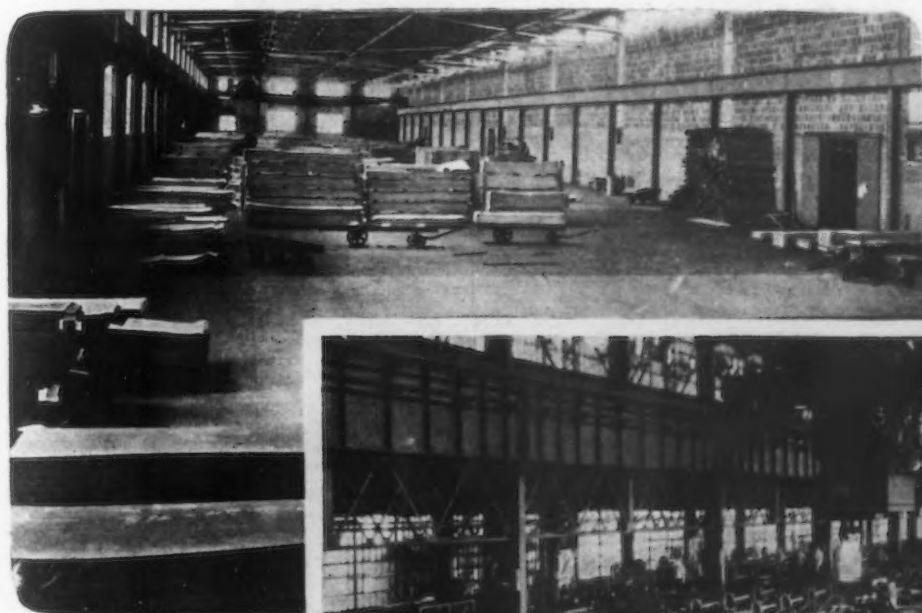
Stands Nos. 1 and 2 are driven by a 2000-hp. Westinghouse induction motor with a speed of 505 r.p.m. Stands Nos. 3 and 4 have a similar motor, while stands Nos. 5, 6 and 7 are driven by an 1800-hp. Scherbius set, with a speed range of 240 to 360 r.p.m.

An interesting observation is the fact that the holding furnace at the mill entrance is not always utilized, because oft times the mill is operating at such speed that the plates entering the mill are at a sufficiently high temperature to make the lighting of the furnace unnecessary.

From the jobbing mill the plates are delivered into the warehouse for distribution to the pickling department, the annealing furnace or the continuous sheet mill. In the case of the latter the material is called rough plate, as it takes the place of the roughed out sheet bar on the conventional sheet mill. If pickling is required the sheets are taken to the sheet pickling building at the north end of the warehouse, this structure consisting of five bays, each of which is 22½ ft. wide and 112½ ft. long.

Before entering the continuous sheet mill the rough plate is matched in pairs and sheared to the proper length. These then enter a continuous heating furnace 140 ft. in length. From this point the plates pass through five 3-high stands, of 30 and 14 x 48-in. rolls, driven by Falk double reduction drives with roll speeds of 25 r.p.m. The first four stands are each driven by a 300-hp. motor, and the fifth by a 400-hp. motor, all motors having a speed of 585 r.p.m. After stands Nos. 2, 3 and 4 are placed reheating furnaces to maintain the sheets at the proper temperature. It

(Concluded on page 1792)



ORDERS for various sized sheets are assembled in this warehouse

THE soaking pit building, with its ingot chariot track shown at the right, joins the blooming mill building in the foreground





Conveyors and Tem for Foundry

TWO portions of the article on the new foundry equipment of the Maytag Co., Newton, Iowa, maker of washing machines, have been published. The present article is the third installment. Handling and melting of iron was described at page 1587 of our June 2 issue, while the methods of handling foundry sand and coke came at page 1660 of the June 9 issue. The present article takes up the mixing of new sand with old and the method of conveying the sand through screens and tempering belt and into the distributing system.

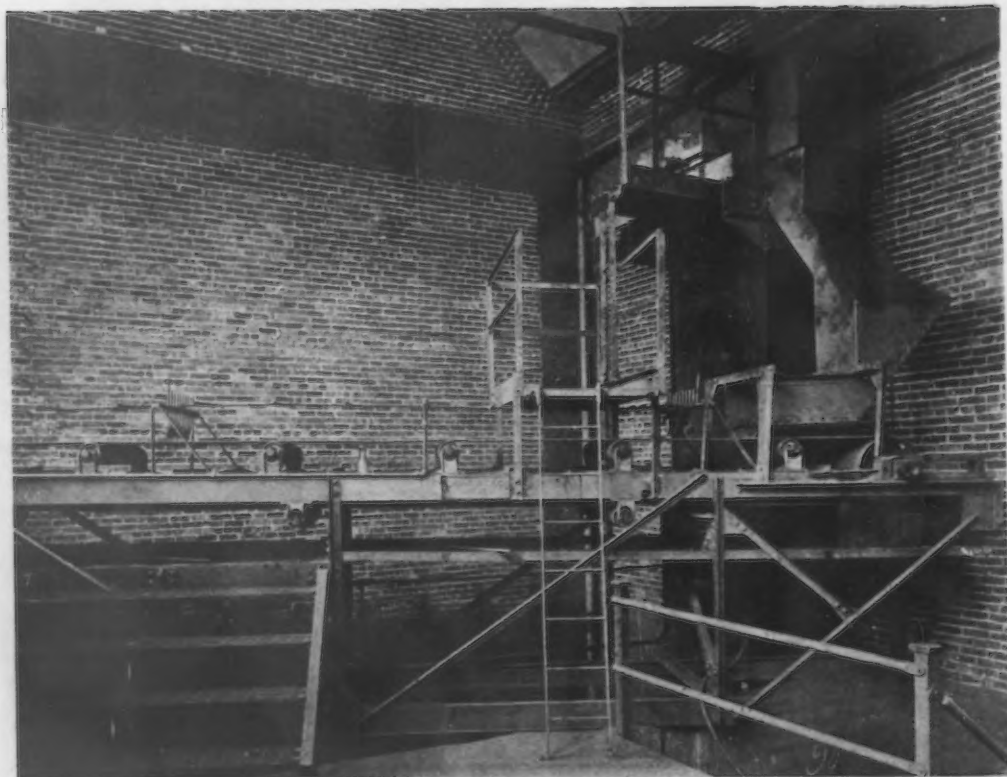
In the new Maytag continuous foundry, the mixing of the sand for 25,000 molds a day is an important



Fig. 2 (Upper Left) Trucks Receiving Tailings. The screen and magnetic separator are located on a raised platform in the cleaning room. Oversize discharge from the screen comes into the truck shown at the right and the metal from the magnetic separator into the truck at the left

Fig. 1 (Above) Sand Screening Unit. Sand from the shakeout above passes into the hexagonal screen and from it on to a belt at the end of which a magnetic separator removes shot iron. The sand passes up elevator at right to the mixing system

Fig. 3 Tempering Belt at Head of No. 2 Elevator Over Large Sand-Storage Bin. Plows and spray pipes are arranged over this belt. The operator stands on platform at top of stairs



through the floor into a cart placed to receive it, as shown in Fig. 2.

The discharge of over-size rubbish and core butts from the hexagonal screen also passes down a spout through the floor into the second cart, placed to receive it, as in Fig. 2. The carts are taken out into an adjoining room on a level with the cleaning room floor. The screen itself, on a floor some 6 ft. above the general cleaning room floor, is so located as to make repairs and inspection easy.

The sand passing up the elevator shown in the background of Fig. 1 is discharged on to a belt and taken up to the corner of the plant, where it enters a bin of approximately 200 tons capacity. Beneath this bin is located a pan feeder which feeds the sand to a second elevator, the head of which is shown in Fig. 3. This elevator discharges on to a tempering belt and a man situated along this line sees to the proper tempering of the sand as it passes.

Sand passing from the tempering belt goes through a Rapp revivifier on to the general distributing belt system in the foundry proper.

Distribution of Sand

The main distributing belt as shown at the left in Fig. 4 is located along one side of the foundry just under the trusses, where it does not obstruct the light in the molding area nor interfere with other equipment. From this belt the sand is plowed off on to a series of cross belts running to the right in the illustration.

Particular attention is called to the way in which inspection walkways have been provided, following all conveyors, and also to the manner in which all conveyors have metal plates under them to take care of any small spillage.

Fig. 5 is a general view taken across the discharge

or shakeout end of the foundry. In the near foreground inside of the railing can be seen the end of a 5-ft. pan carrier on which all castings and sand are shaken out. The castings are subsequently forked through chutes leading to the cleaning room and the sand passes over the end of the conveyor through the floor into the screen shown in Fig. 1.

Behind the end of the conveyor can be seen three of the shovel-out bins with their filling spouts through which sand comes from the plows on the distributing belts above.

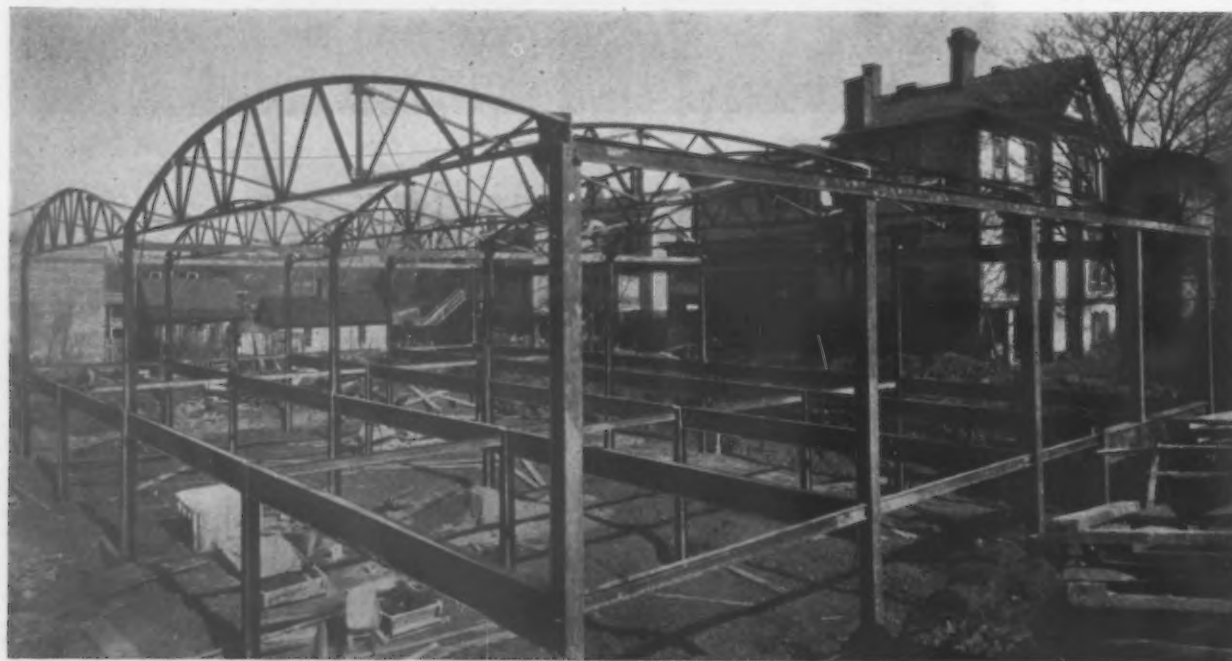
In the background can be seen one end of the 200-ton steel hopper into which the sand passes on its return trip. On the left of the passage is located the casing for the elevator which brings sand up from the screen on its way to the hopper.

For the introduction of new sand into the system there is a hopper in the cleaning room floor or ground floor level of the plant. Sand is brought to this in dump trucks from the sand bins and dumped into the hopper through a grating, as shown in Fig. 6. A small pan feeder feeds this sand slowly into a bucket elevator that in turn discharges it on to the opposite end of the shakeout conveyor from that shown in Fig. 5. In this way the molds are shaken out on top of the incoming new sand and in the course of the various operations the new sand becomes thoroughly blended with the old.

There is also a spillage conveyor belt which ties up the ends of all the distributing belts and returns any overflow sand to the end of the shakeout conveyor where the new sand is introduced.

All of the sand-handling equipment in the plant was furnished by the R. W. McIlvaine Co., Chicago. The H. M. Lane Co., Detroit, served as foundry engineer, making the general layout and looking after equipment. Henry Raeder, Chicago, was architect.

Standardized Roof Trusses for Spans Up to 80 Ft.



THE roof trusses illustrated above have been developed by the Macomber Steel Co., Massillon, Ohio, for the small structural steel fabricator who has been hampered by the high overhead on small orders. The top and bottom chords and the bracing members of the

truss are all single angle sections, and the shop connections are arc-welded. The trusses have been developed in two series to take care of a 2-in. concrete roof decking on metal lath and a lighter roof decking of wood sheathing. The top chords of all trusses are punched

with holes for attaching nurlins of wood joists, steel bar joists or steel channels. In shorter lengths the trusses are shipped in one piece ready for erection, while the longer members are sent out in two pieces with a splice for assembly in the field where the connections are bolted.

Foundrymen Meet in Chicago

Conference on Quality of Foundry Iron a Feature—Gray Iron, Steel and Non-Ferrous Problems Reviewed—Prizes Awarded—Next Convention in Philadelphia

GENERALLY acclaimed the most successful technical sessions in some years, the thirty-first annual convention of the American Foundrymen's Association, in Chicago, last week, June 6 to 10, was somewhat epochal. Far exceeding the early expectations of the officers and board of directors, the total attendance was over 1400 members and guests. From 1896 to 1905 only technical sessions were the rule. The first exhibit of the Foundry Equipment Association was at Cleveland in 1906. But it is 20 years since technical sessions have been held independent of an exhibition. Also for the first time in some years the usual joint sessions of the Institute of Metals did not take place this year.

There were thirteen sessions, four on pig and gray iron, two on sand control, two on non-ferrous metals, two on malleable practice, one on the steel foundry, and one each on apprentice training and foundry costs, with forty papers and reports scheduled.

Favoring a successful meeting was the location. Chicago is a foundry center and the headquarters, the Edgewater Beach Hotel, fourteen miles north on the lake front, was agreed to be ideal.

Leading features of the various sessions are discussed in the following pages.

Foundry Pig Iron Quality Thoroughly Aired

A PROBLEM evidently faces the producers and users of pig iron for foundry purposes. For a long time there have been complaints that the blast furnace is not making as good iron as formerly, due to many alleged causes, among which are too much scrap, too great a forcing of the furnace, and so on. In order to get at the facts and possibly to start some systematic plan toward solving the problem, the program committee of the association arranged a "Conference on the Qualities of Pig Iron for Casting Purposes." Some of the features of this conference are given in the following.

WITH an attendance of about 300, including representatives of foundry iron users and blast furnacemen, under the able leadership of Ralph H. Sweetser, assistant to the vice-president American Rolling Mill Co., Columbus, Ohio, as chairman, many phases of the subject were presented.

Four Leaders of the Discussion

Besides the chairman, there were four leaders of the discussion: Dr. Richard Moldenke, Watchung, N. J.; David McLain, Milwaukee; R. S. MacPherran, Allis-Chalmers Co., Milwaukee; J. T. MacKenzie, American Cast Iron Pipe Co., Birmingham; and J. W. Bolton, Lunkenheimer Co., Cincinnati. E. J. Lowry, Hickman-Williams Co., Chicago, after delivering an address in Grand Rapids, Mich., attempted to reach Chicago by airplane in time for the meeting. About 20 miles from the starting place he was forced down without serious accident, but too late to be present at the discussion.

Chairman Sweetser opened the session with a few remarks to the effect that something is evidently taking place which is causing these complaints. Blast furnacemen admit, he said, that less coke is being used and that too much scrap makes a poor pig iron. The problem in its broadest sense is too big a one for any one group of men to solve.

How to Evaluate Pig Iron

Doctor Moldenke presented his views in printed form under the title "Evaluation of Foundry Pig Iron." If scrap is the cause of the trouble complained of, it must be realized, he said, that blast furnacemen will continue to use scrap. The solution is the getting together of furnacemen and foundrymen to find some way to evaluate foundry iron.

To Mr. MacPherran quality and properties of pig iron are too distinct problems. As to scrap, he had no fixed opinion and to him the answers of blast furnacemen are a mystery. He suggested that some furnace be induced to run alternately on scrap and no scrap, and then test the products completely.

Scrap Not Harmful

Testifying that he was one of those favorably inclined to the use of scrap in blast furnaces for foundry iron, Mr. MacKenzie said that, in the Birmingham district, the three largest merchant iron producers use 10 to 15 per cent scrap with virgin ore and that 25 per cent scrap does not affect iron for pipe. Blast furnacemen must now cooperate and investigate the effect of scrap on quality. Irregular operation of the furnace may be one cause of trouble.

For 25 to 30 years, Mr. Bolton said there had been talk about the mysterious qualities of pig iron. Is this so or not? He commended the plan suggested by Mr. MacPherran.

Mr. McLain offered his comments in a printed paper, "An Expression of Views on the Use of Iron Scrap in the Blast Furnace." His paper brought out some interesting facts regarding the possible complicated composition of pig iron itself.

The foregoing presentation by leaders of the discussion was followed by a lively interchange of opinions by men on both sides. Only a few of the points brought up can be reviewed here.

General Discussion

AMONG the blast furnacemen, the chairman called on D. L. Ward, vice-president and general manager By-Products Coke Corporation, Chicago, who expressed his astonishment that there had been going on a constant retrogression in pig iron quality. Iron made today, in his opinion, is produced under more uniform operations than ever, but one must not be misled by statements.

Less Wind Used Today

The answer to the charge that furnaces are being pushed more is that less wind is now being blown than in charcoal furnaces, said Mr. Ward. As to too much scrap, it is natural to use this to increase tonnage output but it must be remembered that there has been decided improvement in blast furnace lines and in the preparation of the coke, all making for more uniform conditions. The effect of scrap cannot be ascertained

Resolution Passed by Conference on Foundry Pig Iron Quality

BE IT RESOLVED, that it is the consensus of this assembly that a cooperative study of the effects of varying blast furnace operations on the character of the pig iron made under changing blast furnace conditions, and on the castings made therefrom, be conducted under the supervision of the United States Department of Commerce, with an advisory committee consisting of representatives of the national technical associations, such as the A. F. A., American Pig Iron Association, A. I. M. and M. E., and the A. S. T. M.

by ordinary analyses, but there is no noticeable difference with scrap omitted. As to more oxidation than formerly, 25 per cent less wind is used now than in the "good old days" and the possibilities of oxidation are 75 per cent less. Mr. Ward then read some data, hurriedly gathered, to prove this statement. These will be available later in more complete detail.

Quality Deteriorating For Eight Years

For eight years the quality of foundry iron has been deteriorating because of price competition, asserted James A. Murphy, formerly with Hooven, Owens & Rentschler, Hamilton, Ohio, but now a consulting foundry engineer of that city. "More common honesty" is needed, he said. Charcoal iron is now necessary in many foundries to rectify the bad effect of coke pig irons—"not in cast iron pipe, or sash weights, but for high-grade castings." Scrap and more scrap is being used and, continued Mr. Murphy, with characteristic Irish emphasis which created its usual reaction, "we must get rid of the use of old flivver scrap, much of it containing titanium and vanadium and many other such elements."

J. W. Bolton took exception to some of the analyses offered by David McLain in his paper as at variance with the facts. Such analyses to the third decimal place were not possible in 1854. We have now, however, satisfactory methods developed by the United States Bureau of Standards.

Another representative of the blast furnace fraternity, Robert Watts of the Semet-Solvay Co., and for many years a merchant blast furnace operator, said that, in using 25 per cent of borings, it made a great deal of difference as to how they are charged. "I believe in fracture tests and chemical analyses by which to judge pig iron." The casting temperature of the iron from the blast furnace has a pronounced effect on quality.

Borings Can Be Charged Safely

No objection to the use of borings, but a decided protest to the charging of 50 to 60 per cent of pipe,

stove and other scrap was voiced by Doctor Moldenke. Up to 10 to 15 per cent of scrap is not bad, but the continued use of remelted (and oxidized) scrap is unsafe. The only cure then is tremendous superheating.

General Opinions Offered

The operation of the blast furnace has more to do with the results, claimed David Evans, and Phillip Cone, Modern Foundry Co., Cincinnati, cited the fact that specifications are much harder to meet now. A. F. Aubel, a blast furnace operator, claimed that the furnaceman who has control of his iron ore, coke and other materials is sure of a good product; furnaces in general now are obliged to use ores from many sources. This has resulted in a non-uniform rate of reduction of the varying ores in the burden. "I prefer the use of one kind of ore." A foundryman asserted that the iron now is better than in the "good old days," but there "are not three foundrymen here who know how much pressure is being used in his cupola, which is varying from 4000 to 11,000 cu. ft. per min. A standard for pressure is needed."

F. W. Bauer, Rogers Brown & Crocker Brothers, Chicago, pointed out that automobile companies of today could not melt the iron of 25 years ago with cylinder blocks on the scale they do at present. H. B. Swan of the Cadillac Motors Co., Detroit, said that cooperation was surely needed to obtain a standard for 100 per cent pig iron, and Walter Wood of R. D. Wood & Co., Philadelphia, developed his theory of a "personality in pig iron" and said that analyses only afford a look-in.

Government Offers Cooperation

AT the conclusion of the session, Edwin F. Cone, THE IRON AGE, New York, and chairman of the program committee of the association, referred to a suggestion, made recently by Chairman Sweetser, that it would be advisable to have a representative of the Government present at this conference with the hope that its facilities might ultimately be available in helping solve the problem. He reported that, acting upon an invitation from the A. F. A., not one representative, but three had been sent which, he felt, was a matter of congratulation for those interested in the problem and one of decided generosity by Secretary Hoover and the Department of Commerce.

The chairman then called on Dr. C. H. Herty, Jr., Bureau of Mines, Pittsburgh; T. L. Joseph, Bureau of Mines, Minneapolis, and C. M. Saeger, Jr., Bureau of Standards, Washington, the three representatives. Doctor Herty stated that such a problem could not be solved in a year and suggested that, if a research associate could be financed, the various bureaus could furnish their equipment and cooperation. To his mind the problem should be approached not at the blast furnace end but in the foundry and thus work back to the cause. Mr. Joseph and Mr. Saeger expressed similar sentiments.

At the close of the session a resolution was passed unanimously which is found in adjoining column.

Many Gray Iron Subjects Reviewed

THREE sessions were devoted to gray iron problems, one of these relating to cast iron metalurgy, one to shop problems, and another to general foundry practice. Eleven papers were presented, three of these exchange papers prepared by foreign authors. Attendance was large at all meetings, and that a great deal of interest was taken was indicated by quite lengthy discussions. The first session was presided over by R. F. Harrington, Hunt-Spiller Mfg. Corp., Boston, the second by L. L. Anthes, Anthes Foundry Co., Toronto, Ont., and the third by J. W. Bolton, Lunkenheimer Co., Cincinnati.

ONE of the outstanding papers was on "The Effects of Chromium and Nickel on Cast Iron," by R. S. Poister, Electro Metallurgical Sales Corporation, Pittsburgh.

Chromium and Nickel in Gray Iron

Mr. Poister summarized the results of early investigators, which he said appeared to definitely establish that 0.50 per cent chromium in the presence of 1 to 2

per cent silicon increases the tensile and transverse strengths and hardness of gray iron. More recent work has verified the earlier findings. The author pointed out that the field for a cheaper heat-resisting iron is almost unlimited, but the high chromium cast irons are so hard and brittle that their commercial use is restricted. The brittleness can be reduced by reducing the carbon content to around 2.50 per cent, difficult, however, to obtain. Annealing will reduce the

initial hardness of a high-chromium alloy iron but has little effect toward improving the transverse strength. Gray irons containing a small percentage of chromium show a pronounced resistance to oxidation at high temperature, making them suitable for the manufacture of molds. Also a small addition of chromium increases strength while further additions increase the hardness at the expense of strength and deflection. Reducing the silicon increases the hardness.

The greatest benefit from the use of chromium may be expected through the adjustments between chromium and silicon content. By the addition of both nickel and chromium better physical properties can be imparted to gray iron than by the addition of either element alone. The best way of making ferrochromium additions to a cupola is by binding it into briquettes, according to the author. Experimental heats in which 15 per cent of chromium was introduced resulted in a 98 per cent recovery of the charged alloy and uniformity of analysis of the product.

Discussion

The opinion was expressed in the discussion that foundries are prone to overlook the improvements in cast iron for heat-resisting purposes by the addition of chromium. When iron is running hard, it was stated that chromium has the tendency to lower the chills and make it more machinable. One foundry used chromium to correct the shrinkage and cut down the casting losses when running on one mixture. It was suggested that if chromium gives hardness and nickel toughness, good results could be obtained from a combination of the two alloys.

One speaker remarked that, while chromium has its place in cast iron, the question is how much to use. When a foundry uses over 0.50 per cent chromium in automobile cylinder iron, it gets into trouble. The best mixture for this work is obtained by the proper addition of nickel with chromium. D. H. Crosser, Chicago Crucible Co., declared that cupola additions of chromium are more effective than ladle additions. In many cases his plant gets 100 per cent recovery. D. M. Huston, International Nickel Co., New York, said that troubles in making difficult castings of chromium alloy can be overcome by also adding nickel, which is equally resisting to high temperature. Good results, he said, can be obtained by wrapping the alloy in paper and throwing it in the center of the furnace. The recovery will be 94 to 97 per cent. It can be used successfully as a ladle addition provided care is used in the selection of size. It should not be ground too fine.

Fatigue Value of Cast Iron Studied

"Fatigue Tests of Cast Iron" was the subject of a paper by Prof. H. F. Moore and S. W. Lyon, University of Illinois, Urbana, Ill., which was reviewed by the former, who stated that the results given were only preliminary. Professor Moore pointed out that cast iron has not been called upon for repeated tests as much as other metals and not much has as yet been done in fatigue tests. Such tests under reversed bending were made on specimens from four lots of gray cast iron. For each lot there was found a definite fatigue or endurance limit. Tensile, compression, Brinell and impact tests were made. These were shown in tabulated form. The test specimens were cut from 6-in. centrifugally cast pipe. The speaker pointed out that the test showed no clearly defined elastic limit or any sort of a yield point for cast iron. He found that the endurance limit followed the tensile strength in steel and that the same was true of cast iron, but in a lesser degree. The outstanding result of this investigation was that each of the lots of cast iron tested showed a well defined fatigue limit, although this limit was low and the endurance under a dead load is less than that of steel.

Temperature Recorder Aids Regulation of Cupola

The correction of cupola operation by means of a cupola temperature recorder was discussed by H. W. Dietert, United States Radiator Co., Detroit, in a paper, "Correction of Cupola Operations by Means of Cupola Temperature Recorder." He said that his company has in operation six of these temperature recorders, described in a paper presented before the asso-

RALPH H. SWEET-SER, well known pig iron producer, who was chairman of the conference on the quality of foundry pig iron



ciation two years ago, and finds them a great aid in the standardization of cupola operation and iron temperatures. This instrument, previously described (THE IRON AGE, Oct. 15, 1925, page 1044), may be adapted to either a continuous or intermittently operated cupola.

The author presented a number of iron temperature charts made at cupolas at the various plants, showing some of the typical errors of cupola operation, and explained the manner of correcting such operation in order to give uniform iron temperature throughout the heat. He declared that the recorder had proved a valuable instrument to check cupola operations, as it immediately shows any deviation from standard practice. In conclusion he listed various causes of rapid changes of iron temperature in a cupola.

Chaplets and Core Irons Reviewed

Considerable interest was shown in the subject of cast chaplets and tinned and untinned core irons, which was discussed in an exchange paper, "Cast Chaplets and Tinned and Untinned Core Irons," by Jacques Varlet of the Belgium Foundry Technical Association. This was read by R. E. Kennedy, technical secretary of the association. This paper was divided into two parts, the first relating to coated and uncoated steel core bars and the second to cast iron chaplets. The conclusions drawn from tests indicated that iron for tinned chaplets must be pickled before tinning and that, if untreated irons are used as chaplets, they must be well cleaned and have the oxide scale removed before use.

Discussion

In discussing this paper H. W. Dietert said he had been troubled with chaplet blows when he used tin chaplets but, by heating the chaplets and putting them in kerosene, he was able to avoid this trouble. H. M. Lane, Detroit, declared that chaplets should be pickled or sand blasted. This was necessary, he said, to get rid of the scale. One foundryman had trouble in chaplets not burning in, which Mr. Lane said was caused by using too cold iron.

How Graphite Appears in Gray Iron

"Some Graphite Formations in Gray Cast Iron" was the subject of a paper by J. W. Bolton, Lunkenheimer Co., Cincinnati. The author listed five forms of graphite formations in cast iron and stressed the importance of microscopic examination. The phosphorus and silicon effects were also shown to be important. Factors affecting the distribution of graphite were described and the forms of graphite were shown by microphotographs.

Discussion

In the discussion it was stated that the paper pointed out the importance of polishing operations in showing graphite. In reply to a question Mr. Bolton said that, if any of the five forms of graphite were objectionable, it could to some extent be overcome by high heating. The statement was made that it was the general impression that iron having a large percentage of pearlite and large whorl formation is weaker than other iron, but this is not true in respect to stove plate

Chairmen of Four of the Sessions



F. A. FROMMELT



L. L. ANTHERS



N. K. B. PATCH



R. F. HARRINGTON

work. Pearlitic structure was declared to be weaker than a ferritic structure. Mr. Bolton stated that the lower the total carbon and the finer the grain sizes, the stronger will be the iron, other factors being equal.

Why Cast Iron Grows

"The Growth of Cast Iron" was the subject of an exchange paper from the Institute of British Foundrymen, prepared by Dr. J. H. Andrews of the Royal Technical College, Glasgow, Scotland. The author presented a number of conclusions respecting the underlying causes of growth in cast irons. He held that it is evident that no machinable iron can resist the powers that bring about its growth. The rate of growth may be retarded by the addition of certain elements, but if an iron is continuously heated and cooled for a large number of heats, growth will invariably take place.

Cupola lining refractories were discussed in a paper by G. S. Schaller, University of Washington, Seattle, Wash. The author declared that spalling is the greatest single cause for cupola lining failure, in the vicinity of the tuyeres, due to the entrance of air at room temperature. The application of daubing mixtures to linings also causes spalling. Lining failures in the melting zone, he said, are due largely to the corrosive action of the slag. The author recommended the use of the same kind of fire clay for the mortar as is used in making the brick, and stated that monolithic linings in cupolas are gaining in favor.

Discussion

In the discussion it was brought out that trouble is sometimes experienced with abrasive corrosion in the upper part of the cupola due to slag, necessitating relining while the brick in the melting zone is not affected.

Committee Reports

The joint committee on pattern equipment standardization, through D. M. Avey, *Foundry*, Cleveland, submitted a list of recommended practices and in addition offered tentative standards of vibrator designs.

A brief review of the work of the gray iron committee was submitted by its chairman, J. T. MacKenzie, American Cast Iron Pipe Co., who said that through the committee's efforts the Bureau of Standards had become interested in research work on viscosity and fluidity of iron. A cooling rate on blast furnace iron in 75-ton ladles had been worked out.

Core Oils Specified

Interest in one session was manifested in a paper, "Core Oil Specifications," by V. A. Crosby, Studebaker Corporation, South Bend, Ind. The author described the strictly chemical requirements developed in the laboratory of his company, which have given them just what was required for their class of cores. The points involved are specific gravity, flash and fire

points; iodine, saponification and acid numbers; color, odor and weight per gallon. The bearing of these points on the strength of the cores made and the price of oil was also gone into. Two years were required to develop the specifications, which have now been in force a year with excellent results.

Discussion

A discussion, started by Prof. H. L. Campbell, University of Michigan, questioned the advisability of using chemical specifications only, particularly as the determinations are difficult. He felt that it is safer to use strength tests of the cores, irrespective of what is in the core oils purchased and that even linseed oil is a variable material according to the character of the season, making strength tests even more essential.

The author replied that the chemical tests in question are easily learned, accurately performed and that the specifications safely limit the percentage of adulterations. He claimed that 60 per cent linseed oil, 20 per cent rosin and 20 per cent kerosene give a good, cheap and efficient oil. W. G. Smith stated that core oil companies have laboratories and specialists constantly busy improving their products so as to meet any specifications, but that they prefer to furnish oils best suited to the work in hand at the several foundries. He also pointed out the chances of error in estimating oil values by core strengths when baking the cores is so irregular.

Tests Foundry Blackings

A new method of testing the value of a blacking for its crystalline graphite content was presented in a paper, "Foundry Blackings," by D. G. Anderson and A. N. Ogden, Western Electric Co., Chicago. The resistance is measured with a Wheatstone bridge. It would seem that the better and more crystalline the material is, the closer the contact between the crystal plates and the smaller the resistance.

Discussion

The paper was discussed by R. F. Harrington, Hunt-Spiller Mfg. Co., Boston, who said that sand is often blamed for losses which come from poor blackings; thus, if the blacking wash-mixing arrangement, shown in the paper, were used, there would not be so much irregularity in the blacking applied to the cores, and there would be fewer other defects. E. D. Frohman, S. Obermayer & Co., Chicago, discussed the work he was having carried out on the colloidal properties of blacking, notably the clay used in connection with pulverized coke blackings, and J. T. MacKenzie urged that the volatile matter in coke blackings be watched, for when this rose to 3.50 per cent, there is likely to be gas trouble. Mr. Anderson, who presented the paper, stated that his electrical resistance tests give a ready means to distinguish between 48-hr. and 72-hr. coke.

A Few of the Authors of Papers



R. S. POISTER



H. F. MOORE



F. C. SCHEIBER



S. W. LYON

"Analysis of 400 Tons of Defective Castings" is the title of a paper by J. N. Haley, Crompton & Knowles Loom Works, Worcester, Mass., presented in abstract by Technical Secretary Kennedy. The classification of defects of various kinds and the responsibility for them are given by the author, and each line of defect is gone into, with the probability of how they originate discussed.

Discussion

Foundrymen were urged to not always blame the molders for losses, by Eugene Smith, superintendent

of foundries, Crane Co., Chicago, in discussing the paper, but to ascertain whether they have given their molders good materials and good facilities to use these materials properly.

Fluidity of Cast Iron

An exchange paper from the French Foundrymen's Association was entitled "Tests to Establish the Fluidity of Cast Iron," by C. Curry, Ardennes, France. The paper was translated and presented in abstract by J. T. MacKenzie, who accompanied it with a running discussion of the merits of the paper.

Problems in Steel Founding Discussed

STEEL foundry problems took up the time of only one session, but it was a good program and the session well attended. It was presided over by R. A. Bull, Electric Steel Founders' Research Group. Only two preprinted papers were offered, the rest of the time being taken up with several important committee reports and an address on fatigue testing of cast steel.

UNDoubtedly the most important matter coming before the session was the report of the A. F. A. committee on steel castings, presented by Chairman A. H. Jameson, Deemer Steel Castings Co., New Castle, Del. The rest of the committee is R. A. Bull, John Howe Hall, and Lloyd Uhler.

The report was as follows:

Specifications for High Temperature Steel Castings

When your committee began its work this year, it found the specifications for steel castings giving general satisfaction to both the producer and consumer and so recently framed as to reflect pretty accurately the standard practice of progressive foundries. The specifications for railroad castings, after several years' work of separate and of joint committees and in spite of features objectionable to some, had been accepted by both foundries and railroads and were in general use. The only unfinished work then seemed to be the specifications for steel castings for valves and fittings for high temperature service, offered tentatively and still on trial.

During the year there have been many meetings of committees and of committees within committees, at all of which your representatives have been in attendance. There have been many compromises and at the last an impasse, for, in recent meetings of the American Society for Testing Materials committee, it has been voted to permit only the use of open-hearth and electric steel castings, thereby excluding the converter and crucible and to impose chemical limits in addition to physical requirements, this in spite of protests filed by all the foundry organizations of national scope, by many of sectional character and by numerous influential foundries independently, together representing practically the entire organized foundry industry of the country.

So we are now in the very midst of a fight for a principle which affects you all and we ask your support and counsel.

A thorough and animated discussion followed. It was participated in by R. A. Bull, John Howe Hall, A.

W. Gregg, A. H. Jameson, A. H. Lorenz, Edwin F. Cone and representatives of some of the open-hearth and electric foundries. Many questions were answered by the committee's chairman.

The chief burden of the discussion was that a matter of principle was involved—discrimination against certain processes in a specification—which might damage the reputation of the steel made by the processes. Objection was made to the limitation on certain chemical ranges and it was stated that the "side-blow converter and the crucible for castings had been sent to jail without a trial," if the proposed tentative specifications were adopted as recommended by committee A-1 of the A. S. T. M.

A plea was made for an extension of the tentative specifications in the present form for at least another year. It was urged that as many of those present, as expected to be at the annual convention of the testing society the week of June 20 at French Lick, Ind., protest against such action on the floor of the convention. About 14 indicated their expectation of being able to do so.

A Protest Launched

A motion was made and seconded that it is the sense of the steel founders' group of the A. F. A. that a protest be presented to the A. S. T. M. against such specifications because of the principle involved and the danger of such action being extended to other processes or methods in the future, and that the tentative specifications originally adopted be not modified. It was also voted that a copy of this motion or resolution be sent to the executive committee of the A. S. T. M. through the testing society's secretary, C. L. Warwick.

A report of the association's committee on investigation of the effect of phosphorus and sulphur in steel was presented by its chairman, R. A. Bull. It

outlined in some detail the plan adopted to investigate the effect on steel castings and the method to be used to raise money for the work.

The committee on the heat treatment of ferrous metals made a report through its chairman, A. H. Lorenz, Bucyrus Co., Milwaukee. It dealt in detail with definitions of the heat treatment for many materials and recounted the progress made in this field. Other points were also considered.

A most interesting oral presentation on some recent work on the fatigue value of cast steel was presented by Prof. H. F. Moore, University of Illinois, Urbana, Ill., a leading authority on fatigue testing of metals in general. Professor Moore's discussion was based on a recently published bulletin of the university which gives in detail the results of tests on bars of basic open-hearth steel, furnished to him by the American Steel Foundries. Two types of cast steels are discussed: One containing about 0.35 carbon, manganese 1.70, and silicon 0.30 per cent; the other:

Carbon about 0.25, manganese 0.68, and silicon 0.32 per cent, both heat-treated by a uniform method.

The two papers offered in abstract were entitled "A New Type of Mold Drying Oven," by J. M. Sampson and G. H. Wright, General Electric Co., Schenectady, N. Y., and "Characteristics of Some Steel Molding and Core Sand Materials," by E. R. Young, Detroit Steel Casting Co., Detroit.

The new type of drying oven was presented in abstract by Mr. Sampson. It involves a new principle—introducing steam into the oven so as to create a humid atmosphere as the real factor in more efficient drying and the production of a better mold.

Mr. Young stated in his paper that in conducting experimental work seeking cleaner and easier-cleaning castings, he had come to the conclusion that good quality steel foundry materials are pretty nearly adequate and that what is needed is a better application of them. How this should be accomplished is the burden of his discussion.

Non-Ferrous Foundry Problems Talked Over

ONE session and a round table luncheon conference made up the program devoted to the non-ferrous group. Despite the absence of the cooperation of the Institute of Metals division of the American Institute of Mining and Metallurgical Engineers, which has for some years been a feature of the foundrymen's conventions, the program was decidedly successful and well attended. The division will now associate itself with the American Society for Steel Treating in September because of the change in time of meeting from fall to spring by the foundrymen.

AT least 125 were present at the technical session, the feature of which was a conference on gating non-ferrous castings.

How to Gate Non-Ferrous Castings

Six contributions in a preprint, "Gating Non-Ferrous Castings," were offered and discussed by representatives of as many foundries. The examples of various methods of solving certain problems in gating were interesting and resulted in much profitable discussion. The following companies were represented in the printed illustrated suggestions: Binney Bronze Co., Toledo, Ohio, by R. L. Binney; Neptune Meter Co., Long Island City, N. Y., by D. E. Broggi; Ohio Brass Co., Mansfield, Ohio, by C. V. Nass; Wolverine Brass Works, Grand Rapids, Mich., by W. F. Hersh; Ohio Injector Co., Wadsworth, Ohio, by E. F. Hess and General Electric Co., Erie, Pa., by R. R. Clarke. Numerous questions were answered by each and it was interesting to note that the solution of the difficulties of one or two foundrymen were suggested freely by others present who had had similar problems to solve.

Reducing Losses Due to Molding

The problem of what can be done to get closer union between or cooperation among molders, instructors, foremen, metallurgists, engineers and other groups in a brass and malleable foundry was discussed by R. A. Greene, assistant manufacturing superintendent, Ohio

Brass Co., Mansfield, in a paper, "The Reduction of Molding Losses."

A most interesting exposition of the plan in effect at this company's plant was outlined and many questions were answered by the author. Keen rivalry between groups of molders, led by an instructor, is established by a system which involves accurate and detailed daily records as the nucleus of the system. The records are posted daily and reveal the losses of each molder and group with the causes determined. By means of this system, it is stated that the losses have been cut from a yearly average of about 8.50 per cent to one of about 4.50 per cent, which in this particular plant means a saving of some 200,000 lb. of castings.

Improving Aluminum Bronze

A British metallurgist of Birmingham, England, Dr. R. C. Reader, offered a paper, "Improvement of Aluminum Bronze as an Engineering Material." An excellent abstract was presented by C. J. Zaiser, American Metals Products Co., Milwaukee.

Preliminary to the presentation of this paper, some remarks were made on the progress of the work of the Aluminum Bronze Manufacturing Institute made up of five companies.

Foundry Refractories Studied

H. M. St. John, Detroit Lubricator Co., distributed four charts embodying a report of the joint committee



D. G. ANDERSON



V. A. CROSBY



J. W. BOLTON



E. R. YOUNG

on foundry refractories. They bring out much valuable information on this new problem, based on questionnaires sent to companies using electric furnaces, or crucible furnaces burning coke or coal and others.

N. K. B. Patch, Lumen Bearing Co., Buffalo, presided at this session.

Large Attendance at Round Table Luncheon

The round table conference on brass foundry problems proved to be one of the most interesting meetings of its kind held in years. Fully 125 were in attendance

and the discussions were stopped late in the afternoon only when the room had to be vacated. Chairman N. K. B. Patch, Lumen Bearing Co., Buffalo, N. Y., organized each table into a group which elected a leader and questions were brought to the attention of the meeting in an orderly and business-like manner. This fostered the spirit of informality and led many foundrymen into discussions which dealt with the full range of important phases of brass foundry operation. As is the custom, no report of the discussions is permitted.

Important Malleable Foundry Topics Discussed

MALLEABLE problems were covered in two sessions—one devoted to malleable foundry and one to sand control for such foundries. They were both presided over by L. C. Wilson, Federal Malleable Co., Milwaukee, and the attendance was large. A theory relating to the effect of temperature gradients as influencing final products of the blast furnace was offered by Prof. R. S. McCaffery, University of Wisconsin, Madison, Wis., in a paper entitled "Variations In Pig Iron Quality." The results obtained by the use of synthetic molding sands at the Erie, Pa., plant of the General Electric Co. were outlined by F. C. Scheiber, of that company.

THAT the properties of pig iron are not entirely due to its chemical composition but that its compound composition may profoundly influence its properties was pointed out by Professor McCaffery.

Blast Furnace Conditions Not Uniform

Conditions in a blast furnace are not uniform at any one time nor are they uniform from day to day. Along any vertical line inside of a furnace there is at some fixed time a definite temperature gradient which is different from the temperature gradient along other vertical lines at the same time. Since all chemical reactions have a definite free energy at a given temperature and with some reactions the free energy increases as the temperature rises, though with other reactions the free energy decreases with rising temperature, then it is apparent that chemical reactions have a velocity that varies with the temperature and that chemical affinities also vary with temperature.

This means that in the ordinary operation of a blast furnace, a number of chemical reactions are taking place simultaneously at a given temperature and that one reaction will predominate over the others, while at a different temperature another reaction will predominate. A number of reactions may all be taking place at the same time to a greater or less degree. The velocities of these reactions change with the furnace temperature and the passage of particles down the furnace brings these particles into zones of different temperatures and the order of the reactions keeps changing. All parts of the charge are not carried down the shaft along the same temperature gradient so that the reactions are not taking place uniformly at one time in the furnace and uniformity of conditions is not maintained. The reactions that take place in the furnace produce the various carbides, common silicides, sulphides and phosphides of iron and manganese.

Therefore, one kind of iron of a definite compound composition may be produced by passing along one temperature path, while iron of a different compound composition may result in taking another path. Compound composition is different in the two cases, but the chemical composition may be the same.

The theory as outlined indicates how the relative amount of compound which may be present in pig iron might change, due to the variation of blast furnace operating conditions. Therefore, when it is considered that some of the compounds may vary by considerable percentages, the variation in the properties of pig iron of similar analysis but produced under different conditions does not seem so extraordinary.

Discussion

During the discussion it was pointed out that furnace reactions are dependent on two factors, temperature and pressure. Inasmuch as the pressure is constant the governing factor, therefore, is the temperature. It was also brought out that the reaction resulting from the introduction of ferroalloys varies according to the time element, this being the factor that governs the distribution of the ferroalloy throughout the molten metal.

A Synthetic Molding Sand Developed

Five years of research work at the Erie, Pa., malleable iron foundry of the General Electric Co., has resulted in the development and use of a synthetic molding sand that can be produced for \$2.80 a ton, including the cost of manufacture, depreciation and up-keep on the equipment. Mr. Scheiber, in his paper, "Synthetic Molding Sands in the Malleable Foundry," stated that the greatest waste in a foundry is discarded sand, which after being once used is thrown out on the dump at a cost of \$2 a ton to carry it out of the foundry.



J. T. MACKENZIE



O. W. POTTER



J. L. JONES

THREE foundrymen who are to present exchange papers to the British, Belgian and French foundry associations. Details were published in *The Iron Age*, May 26

After 2½ years, during which time nothing but prepared sand has been used, the General Electric Co. has come to the conclusion that losses have decreased beyond expectation, that the appearance of the surface of its castings has improved and that molding conditions in general are much better. Core sands that are to be treated should be of uniform size, round and of good sound structure, such as Ottawa or Michigan drift sand. At the General Electric Co.'s foundry the sand is used first for cores and, after casting, it is run through a barrel type furnace with heat high enough to burn out all core binder and water crystals, thus making the surface clean.

MAJOR BULL was presented with the Joseph S. Seaman medal at the banquet. Some facts as to his career appear in *The Iron Age*, May 12



MAJOR R. A. BULL

Discussion

The discussion was lead by H. B. Hanley, Whitehead Brothers Co., Rochester, N. Y., and by H. W. Dietert, the United States Radiator Co., Detroit; J. H. Lansing, Danville Malleable Iron Co., Danville, Ill.; H. S. Malsberger, American Chain Co., and E. F. Wilson, Jefferson Union Co., Inc.

In answer to numerous questions Mr. Scheiber stated that ½ oz. of glycerine was required for each 100-lb. of sand and that the glycerine was put into the water and well mixed before being added to the batch. Water is used at the rate of 33 qts. to each ton batch of sand and clay.

Pickling Solution Recommended

A brief discussion on pickling solutions was led by F. L. Wolf, Ohio Brass Co., Mansfield, Ohio, who offered his paper, "Pickling Solutions." This company has found that a 5 to 6 per cent solution of sulphuric acid proves to be entirely satisfactory. Castings upon being received from the foundry are given a light sand blast so that they may be readily inspected. They are then packed and normalized at 1200 deg. Fahr. after which they are quenched, sand blasted and pickled. Castings that are to be galvanized are again sand blasted. Mr. Wolf stated that the use of an inhibitor had no effect whatever upon the surface of the casting to be galvanized, but that the method of holding back fumes had been discarded when a ventilating system was installed.

Without the ventilating system seven men had handled 1500 lb. of product per 10-hr. day, said Mr. Wolf. Since its installation two men can turn out 3000 lb. of product per day. Pickling costs were said to be about \$1.60 per 1000 lb. of metal, while sand blasting, using a pressure machine and grit, proves to be a trifle cheaper and equally satisfactory; therefore there is a possibility that the time will come when pickling will be discarded. Electrolytic pickling was said to be complex but of value on burned castings.

The Banquet and Prizes Awarded

NEARLY 1000 sat down to the annual banquet, Wednesday evening, June 8, in the ball room of the Edgewater Beach Hotel. It was presided over by S. W. Utley, Detroit Steel Castings Co., Detroit, who delivered an address on "The Foundry Industry." It

was an impressive one, both from a literary and oratorical standpoint, evoking much favorable comment. Tracing the industry from its earliest days and showing that it was the oldest of all industries, Mr. Utley brought out, among many other interesting facts, the point that only in the last 30 to 40 years has the industry become organized on an efficient basis.

Presenting the Seaman Medal

The Joseph S. Seaman medal was appropriately presented by past president, A. B. Root, Jr., to Major R. A. Bull, research director Electric Steel Founders' Research Group, Chicago. This was referred to in *THE IRON AGE*, May 12. Major Bull's response to the bestowal of the honor was most appropriately phrased, giving much credit to a group of six men who some years ago assisted him in doing some unusually constructive work for the association. The chief speaker of the evening was Dr. Preston Bradley, pastor of the People's Church, Chicago, who with the subject, "Facing the Future," electrified and amused those present.

Attendance Contest Prizes

Announcement was made that the board of directors had awarded to the New England Foundrymen's Association a gavel as the prize for the winner of the association attendance contest. This association had 12 members present, their combined mileage exceeding that of any other organization. The individual attendance contest was won by William McLeary, Consolidated Mining & Smelting Co. of Canada, Ltd., Frail, B. C. The prize has not yet been purchased, the association waiting for a selection to be made by Mr. McLeary.

New Officers

At the annual business meeting, as already announced in *THE IRON AGE*, March 17, the present officers were reelected for another year and three new directors were added to the board, as explained in our issue of May 12.

Molding and Apprentice Contests

At the annual business meeting the report of B. D. Fuller, Cleveland, on the apprentice molding contest winners and the report of W. F. Grill on the pattern apprentice contest were presented.

W. F. Grill of the Western Foundry Co., Chicago, together with his committee, W. C. Ewalt of the Walworth Co., Kewanee, and J. C. Palmer of Dodge Brothers, Detroit, reported that the winners of the apprentice pattern contest were:

First prize: Siegfried V. Hanson, apprentice at Pettibone-Mulliken Co., Chicago.

Second prize: Joseph L. Asp, apprentice at Pettibone-Mulliken Co., Chicago.

Third prize: Lester G. Furber, apprentice at Brown & Sharpe Mfg. Co., Providence, R. I.

Benjamin D. Fuller, chairman of the molding contest and the members of his committee, Pat Dwyer of *The Foundry* and Eugene Smith, Crane Co., Chicago, reported that the winners of the gray iron apprentice molding contest were:

First prize: H. E. Stromberg, apprentice at General Electric Co., Lynn, Mass.

Second prize: Y. Sawtelle, apprentice at General Electric Co., Lynn, Mass.

Third prize: W. Urquhart, General Electric Co., Lynn, Mass.

The winners of the apprentice steel contest were:

First prize: Carl H. Oleson, Pettibone-Mulliken Co., Chicago.

Second prize: Andrew Bottoni, apprentice at Falk Corp., Milwaukee, Wis.

Third prize: Joseph Buneta, apprentice at Falk Corp., Milwaukee, Wis.

Next Convention

The 1928 convention, with the regular exposition of foundry equipment a feature, will be held in Philadelphia, late in May or early in June, at the Commercial Museum.

The report of the sessions on foundry sand, costs and apprenticeship is held over to next week.

Modernizing Industrial Power Plant

Importance of Watching Many Phases of Operation and Control—Economies and How They May Be Had

BY MAJOR C. G. SPENCER

MODERNIZATION, as applied to the industrial power plant, may be defined briefly as causing it to conform to modern ideas. Stated another way, it is: to reduce the annual power bill, taking into account both operating expenses and fixed charges. The importance of industrial power is illustrated by the annual consumption of bituminous coal. The United States Bureau of Mines shows that 31 per cent was used in 1923 by industrials, 30 per cent by railroads, 7 per cent by public utilities, and the remainder by domestic users, coke and gas plants and shipping.

Of the stationary water-tube boilers manufactured annually in the United States, about 25 per cent, on a square foot basis, go into utility plants, and the remaining 75 per cent mainly to the industrials.

What we consider today as a modern practice had its beginning at the turn of the century, and within the memory of most of us present, when the engine or water-driven line shaft transmitted energy through belts and the electrification of industry first became possible. Electrification has steadily gone on until now it is well nigh universal. One leading electrical manufacturer advertises that more than 60 per cent of the mechanical power used by American industry is applied through electric motors. The steam-electric plant has assumed first place in the generation of energy, with the result that unusual effort has been made to improve its efficiency. It is largely since the war that marked economies have been made, public utilities having led in this field.

Centralized Plants

There has been a definite trend for several years toward centralization in the generation of power as in other fields. This is largely the result of improved efficiency in the modern central station, where the generation of a kw-hr. from 1 lb. to 1½ lb. of coal is no longer unusual. In plants electrified and generating their own power, it is simple and inexpensive to change over to purchased power, always assuming that the economics are correct. This is the simplest and least expensive way, from an investment point of view, of modernizing an industrial power plant.

An industry which both generates and purchases power is faced with the possibility of an interruption to the purchased supply. Reverse power, overload or low-voltage relays may open the line switch. But this does not prevent the plant generators from being overloaded and the generator circuit breakers from opening on overload when the outside power fails. A practical method of preventing this has been successfully applied—an auxiliary switch on the main circuit breaker of the incoming power line, which trips out a pre-determined load when the circuit breaker of the incoming line opens.

Importance of Power Factor

Power factor is often neglected in the industrial plant. Most power companies impose penalties for low power factor, which should be sufficient incentive for correction. But it is often overlooked that the losses are about twice as great when operating at 70 per cent as at unity power factor. It is not unusual to find plants operating at below 70 per cent. A power factor survey is a good investment. It often

discloses underloaded induction motors and conditions of overloading where a shifting of motors without additional investment would effect an improvement. In plant extensions or betterments, where synchronous motors are justified, their use is a big help. The synchronous motor is now developed so that the problem of starting under load is no more complicated than with an induction motor. The static condenser has been developed, also, in sizes and voltages applicable to the usual range of induction motors found in industrial plants, and is an excellent piece of equipment for power factor correction, retaining existing drives.

Use of Steam for Processes

In many industries, particularly those employing heat processes, power can be generated by using the prime mover as a reducing valve between boiler pressure and the process mains. Some industries have an excess of low-pressure steam in summer and a shortage during the heating season in the winter. The mixed-pressure turbine meets this condition. Turbine builders are prepared further to offer bleeder turbines for both process steam and feed-water heating. Many of the older turbines now installed may be bled to heat feed water, either replacing present methods or increasing the feed water temperature to a higher point. Where bled steam replaces an existing system, and there is sufficient electrical capacity in the main unit, it will often prove economical to electrify low-efficiency steam-driven auxiliaries.

Industries where waste heat is available for steam generation, and industries in localities not economically served by central stations, justify the isolated power plant. For these cases, whether they generate all or part of their power, interest centers in the boiler room, where the greatest economies can be made and where recent advances have been most rapid.

Because of these advances there is a tendency to adopt innovations in a zeal to produce high thermal efficiency, expressed most commonly as B.t.u. per kw-hr. or in cents per 1000 lb. of steam for coal and operating labor. But the true measure is the annual cost, with fixed charges added to the operating expense. This acid test takes into account the interest on investment, depreciation, taxes and insurance, and also the load factor, over the useful life of the plant.

Using Large Boiler Units

There is a tendency, in selecting boilers for industrial plants, toward larger and fewer units. This reduces first cost of boilers, settings, piping and structure, as well as operating labor and maintenance. It often permits, in modernizing existing plants, the utilization of a structure originally designed to house a larger number of small boilers.

We hear occasionally of boilers operating at 400 per cent, 600 per cent of builder's rating, and even higher. Usually these high rates of operation are for short periods of time, and they are obtained only in plants where high capital investment is justified. Engineers designing industrial boiler plants, to avoid under-boiling, will be wise in adopting moderate ratings. The troubles in an under-boilered plant are cumulative, the severe punishment incident to excessive rating usually requiring a high percentage of boiler outage, with a demand for even greater performance on the remaining units. Maintenance is slighted because of the necessity for getting a boiler back on the line.

Abstract of paper presented at the regional Industrial Power meeting of the American Society of Mechanical Engineers, Erie, Pa., June 3. The author is a consulting engineer (Baker & Spencer), 117 Liberty Street, New York.

This is the most important decision in the whole design. A conservative rule is to design so that one boiler may be out for a complete external and internal cleaning and furnace repair without loading the remaining boiler or boilers beyond 300 per cent rating. This means, in a plant with two boilers, that the normal operation is at 150 per cent, which is often the point of highest efficiency. In a plant with three boilers, the normal operation might be 200 per cent. In this era of high ratings, many well-engineered plants are operating normally at 200 per cent. With four boilers installed on this basis, the normal operation, with one boiler out, reaches 225 per cent, and so on. These figures are based on well-designed refractory-lined furnaces. Higher ratings may safely be reached, depending on the fuel and the justifiable expenditure, by the use of air or water-cooled furnaces.

Capacity of Boiler Furnaces

Furnace volume and heat release, usually expressed in B.t.u. per cu. ft. of furnace volume per hr., largely determine the boiler performance, whether with oil, gas, stokers or pulverized fuel. Early ignition, by an intimate mixture of fuel and air immediately on entering the furnace, and the use of preheated air, is making furnace volume more effective. In powdered fuel furnaces the use of preheated air and turbulence in the entering coal and air mixture is increasing the B.t.u. per cu. ft. and thereby decreasing furnace volume.

Three or four years ago the limit of heat release was about 23,000 B.t.u. Today, with the most improved water-cooled furnaces, it is around 40,000, with isolated examples at 60,000. The character of the ash in the fuel has an important bearing on the design of the walls. A low-fusing ash, high in iron and sulphur, will wash down and destroy a fire-brick wall. With a fuel such as this, air cooling the walls by drawing combustion air through them is of some help, but better results are obtained by water-cooled walls connected as a part of the circulating system of the boiler and materially increasing the evaporating surface.

These walls are exposed to the radiant heat of the furnace, either as bare tubes or tubes protected by metal blocks, and in another design by metal blocks faced with fire brick. The water-cooled furnace has now been in service long enough to demonstrate its value in permitting high furnace temperature, high rating, and reduced maintenance. The decision to install partial or complete water cooling, either for stokers or pulverized fuel, depends on the characteristics of the fuel and the justifiable expenditure.

Increased ratings and a better knowledge of the results of radiant heat have brought about changes in boiler baffling. When equipment is installed or furnaces rebuilt for operation at high ratings, a study of the boiler baffles is important. Built-in-place baffles, now installed in all types of water-tube boilers, offer an inexpensive method of modernizing, either by replacing leaky baffles or improving furnace conditions and reducing exit gas temperatures.

Pulverized Fuel vs. Stokers

About five years ago the use of pulverized fuel received a decided impetus. The result of these inroads in what had theretofore been the field of the stoker brought about a big improvement in stoker design and performance, particularly for bituminous coal. The present furnace with its higher efficiency and lower maintenance has been developed largely to meet the requirements for burning pulverized fuel. The development of the clinker grinder on the under-feed stoker has materially increased its efficiency.

Early installations for pulverized fuel were largely on the basis of the unit mill, where raw coal was delivered directly to the mill and thence to the furnace. Many disappointments led to the development and extensive application of the bin and feeder system. With many coals it was found that to be successful the coal required drying before storing and feeding, which introduced additional equipment and added to the investment. Success of the bin and feeder system has stimulated the development of unit mills. Today there are unit mills of the high-speed impact type, slow-speed tube-mill type, and vertical medium-speed mills of the bull-ring type, in successful operation on boilers. There

is a noticeable trend, both for small and large installations, toward the unit system.

Treatment of Ash

Experience has proved the non-existence of an ash nuisance in many pulverized fuel plants. Where it is considered imperative, equipment has been developed to collect the ash by electrolytic precipitation or mechanical dust arresters, and in some cases by cyclones between boiler breaching and stack. The explosion danger cannot be ignored, but experience has developed designs to guard against this and to minimize the effect of an explosion, should one occur.

Ash disposal from either stokers or powdered coal continues to be a difficult problem. Where conditions permit, there is a decided trend toward the use of sluices discharging the ash into a sump, from which it is excavated usually by clam-shell bucket.

The decision for pressure and superheat in an industrial plant is largely governed by local conditions. Boilers and superheaters are now available for 1400 lb. pressure and 750 deg. Fahr. total temperature. The radiant heat superheater, either alone or in series with a convection type, is now developed successfully and has many advantages.

Conserving Waste Heat

In industries releasing large volumes of high-temperature gases, such as steel plants, copper smelters, cement mills and lime plants, the waste-heat boiler is justified unless a very low power rate is available. In most of these applications the gas is laden with abrasive dust. This presents a problem in collection and disposal, as well as in the selection of induced draft equipment not subject to rapid wear.

Dependent on the price of fuel and load factor, economizers and air heaters are justified. Speaking generally, the economizer field is in plants where low-head heat, or steam bled from a turbine, is not available to heat the feed water. The air heater field is where the heat from the exit gases cannot be used in feed water heating, but is available for heating the combustion air or for other purposes. Preheated air is of value both in stoker and pulverized fuel installations. In some air heater designs, using steel tubes, the surface exposed to the gases is protected by cast iron. In another design both the inside and outside of the steel tube is protected by a lead coating.

Corrosion from dissolved oxygen in the feed water, which has caused heavy maintenance in steel tube economizers, and in the boiler proper, is now controlled by de-aerating the boiler feed and introducing oxygen-free water into the boiler.

Clean Evaporation Surfaces Essential

Higher rating in boiler operation has developed a keener appreciation of the desirability, and in many cases the necessity of delivering dry steam from the boiler, not only to improve superheat, but to prevent damage and improve efficiency in saturated steam plants. This has led to development of apparatus for removing moisture and solids from steam leaving a boiler. Installation of such equipment often helps.

Large boiler units operated at high ratings must maintain a clean surface on the inside of tubes and drums, not only to obtain high efficiency and prevent tube failure, but to lengthen the interval between shutdowns for cleaning. It is imperative to remove hard scale-forming solids from the feed water before it enters the boiler, and in many cases it is economical to evaporate the make-up water.

Automatic Control Requires Expert Supervision

There is a tendency in modern industrial plants to reduce the element of manual control, replacing it by automatic control, which acts with less delay and greater precision, resulting in the long run in a substantial saving. It should not be installed unless the management is prepared to provide high-grade attendants to supervise its operation. This is likewise true of all instruments and automatic equipment. To be modern, a plant must be equipped with sufficient instruments to indicate and record what is going on, but these records are of no value unless they are intelligently interpreted.

Pig Iron Consumption in 1926 by Four

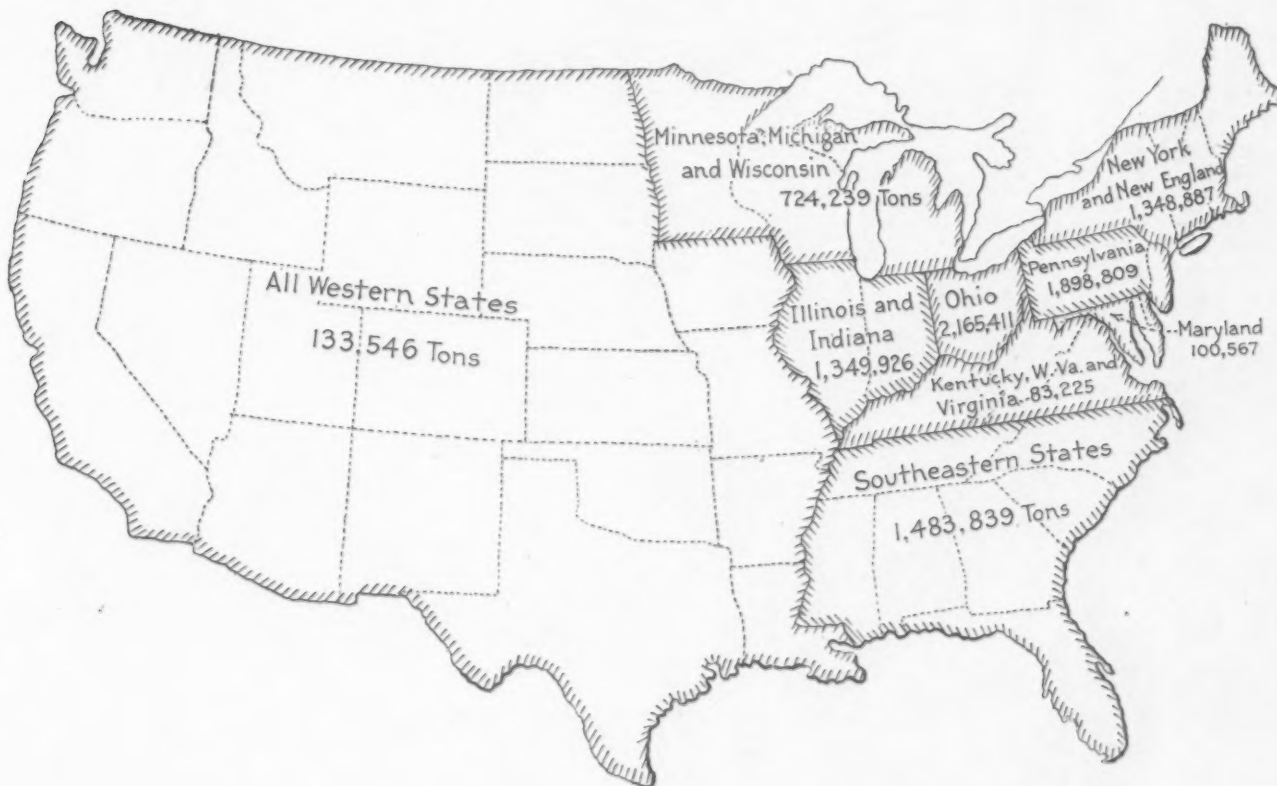
THE IRON AGE has completed a survey of the consumption of pig iron by foundries in the United States during 1926. Questionnaires were sent to the 4326 ferrous foundries shown in the latest edition of *Penton's Foundry List*, and replies were received from 2945, or 68 per cent. The total melt of these foundries in the year was 8,559,018 gross tons of all grades. Of this, 7,382,621 tons was foundry and malleable iron; 743,623 tons was basic and Bessemer; 339,085 tons was low phosphorus; 47,209 tons, charcoal; 33,254 tons, silvery; 3326 tons, Mayari; 9900 tons, miscellaneous grades or special analysis.

The 1381 foundries which did not report included some which were stated by the Post Office Department to be "out of business." A checking of the foundries from which no replies were received disclosed that many of them

were of small capacity. Among the companies which did not melt any iron last year; some used

Total pig iron made for sale in 1926, American Iron and Steel Institute, was 9,288,449 gross tons; 6,576,503 tons was basic and Bessemer; 2,638,105 gross tons; our returns account for 88 per cent. Thus, it would appear, 68

Imports of pig iron last year amounted to \$10,000,000, presumably was for foundry use, making a total of 9,288,449 gross tons available for merchant use in this country for 88 per cent. Thus, it would appear, 68



DISTRIBUTION
Districts of mercantile iron produced last year (left), figures are statistics of the American Iron and Steel Institute, a total of 9,288,449 gross tons was basic and Bessemer and malleable iron, 2,638,105 tons was basic, and 6,576,503 tons was Bessemer and malleable iron.

CONSUMPTION
Chart pig iron in United States (at right). The figures indicate the tonnage taken by the foundries in each State, and smaller figures indicate the number of foundries from of the total operating in the State the year.

1926 Consumption of Pig Iron in United States by Grades (Gross Tons)

New York and New England								
State	Total Consumption	Foundry and Malleable	Basic and Bessemer	Low Phos.	Charcoal	Silvery	Mayari	Per Cent of Foundries
Maine	5,168	3,813	...	1,355	...	...	...	51
New Hampshire	6,262	4,852	200	1,210	...	...	...	55
Vermont	12,175	11,875	300	...	...	...	...	81
Massachusetts	190,755	185,806	2,878	2,071	...	...	...	65
Rhode Island	36,335	36,335	...	...	...	...	...	71
Connecticut	120,657	107,187	2,810	1,660	500	...	...	79
All New England	371,352	349,868	6,188	6,296	500	...	8,500	67
New York	767,650	670,299	86,013	11,223	115	...	...	77
Total	1,139,002	1,020,167	92,201	17,519	615	...	8,500	73
*Chill rolled.								
Middle Atlantic States								
New Jersey	483,031	472,248	3,414	7,070	57	...	242	70
Eastern Pa.	597,651	381,854	138,003	63,888	11,617	...	2,289	73
Delaware	4,940	4,040	...	900	...	...	...	50
Maryland	76,703	63,095	13,272	...	225	...	111	62
Dist. of Columbia	3,480	2,578	2	900	...	...	...	45
Total	1,165,805	923,815	154,691	72,758	11,899	...	2,642	70
Plains States								
Minnesota	34,581	29,265	4,355	811	150	...	...	72
Iowa	60,112	44,552	14,470	1,050	40	...	...	73
Missouri	152,369	121,079	27,837	3,266	187	...	...	74
North Dakota	...	...	...	...	...	...	...	100
South Dakota	100	100	...	...	...	...	...	33
Nebraska	2,875	2,478	30	367	...	...	...	76
Kansas	10,421	10,421	...	...	...	...	...	53
Total	260,458	207,895	46,692	5,494	377	...	...	71

Arkansas, Louisiana, Oklahoma			
State	Total Consumption	Foundry and Malleable	Basic and Bessemer
Arkansas	300	300	...
Louisiana	2,597	2,162	225
Oklahoma	6,613	6,612	...
Texas	13,933	10,820	350
Total	22,543	19,894	575
Rocky Mountain			
Montana	57	50	...
Wyoming	26	1	...
Colorado	28,006	25,652	1,854
New Mexico	150	150	...
Idaho	162	112	...
Utah	1,959	1,959	...
Nevada	220	210	...
Arizona	65	65	...
Total	30,645	28,199	1,854
Southeastern States			
Virginia	111,050	109,901	185
Kentucky	95,724	91,609	2,500
North Carolina	15,220	14,420	...
Tennessee	323,122	300,940	680
South Carolina	1,360	1,300	...
Georgia	34,696	34,246	300
Florida	2,069	1,989	75
Alabama	1,024,777	992,686	333
Mississippi	1,351	1,351	...
Total	1,609,369	1,548,442	4,073

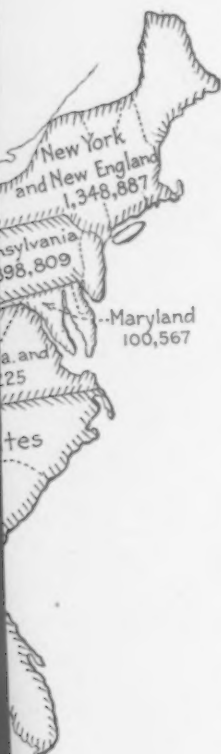
in 1926 by Foundries as Shown by I

were of small capacity. Among the companies reporting were a few which did not melt any iron last year; some used only scrap.

Total pig iron made for sale in 1926, according to the figures of the American Iron and Steel Institute, was 9,288,449 tons, of which 2,105,173 tons was basic and 532,932 tons was Bessemer and low phosphorus, a total of 2,638,105 gross tons; our returns account for 1,082,708 tons of basic, Bessemer and low phosphorus as consumed by foundries.

Imports of pig iron last year amounted to 445,602 gross tons, most of which presumably was for foundry use, making a total of approximately 9,735,000 tons available for merchant use in this country, of which this survey accounts for 88 per cent. Thus, it would appear, 68 per cent of the foundries in the

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DISTRIBUTION by districts of merchant pig iron produced last year (at left), figures are based on statistics of the American Iron and Steel Institute. Of a total of 9,288,449 gross tons, 6,576,503 tons was foundry and malleable iron, 2,105,173 tons was basic, and 532,932 was Bessemer and low phosphorus.

CONSUMPTION of merchant pig iron in 1926 by States (at right). The larger figures indicate the tonnage taken by the foundries reporting in each State, while the smaller figures indicate the number of foundries heard from of the total number operating in the State during the year.



Arkansas, Louisiana, Oklahoma and Texas

State	Total Consumption	Foundry and Malleable	Basic and Bessemer	Low Phos.	Charcoal	Silvery	Maryland	Misc.	Per Cent of Foundries
Arkansas	300	300	...	...	...	...	...	...	18
Louisiana	2,597	2,162	225	210	...	...	...	...	42
Oklahoma	6,613	6,612	...	1	...	...	...	...	59
Texas	13,033	10,820	350	1,863	...	...	...	...	66
Total	22,543	19,894	575	2,074	...	...	...	...	54

Rocky Mountain States

Montana	57	50	...	7	...	...	...	...	55
Wyoming	26	1	...	25	...	...	...	...	66
Colorado	28,006	25,652	1,854	...	500	...	...	...	60
New Mexico	150	150	...	...	...	...	...	...	33
Idaho	162	112	...	...	50	...	...	...	22
Utah	1,959	1,959	...	...	...	...	...	...	75
Nevada	220	210	...	10	...	...	...	...	50
Arizona	65	65	...	...	...	...	...	...	23
Total	30,645	28,199	1,854	42	550	...	...	...	53

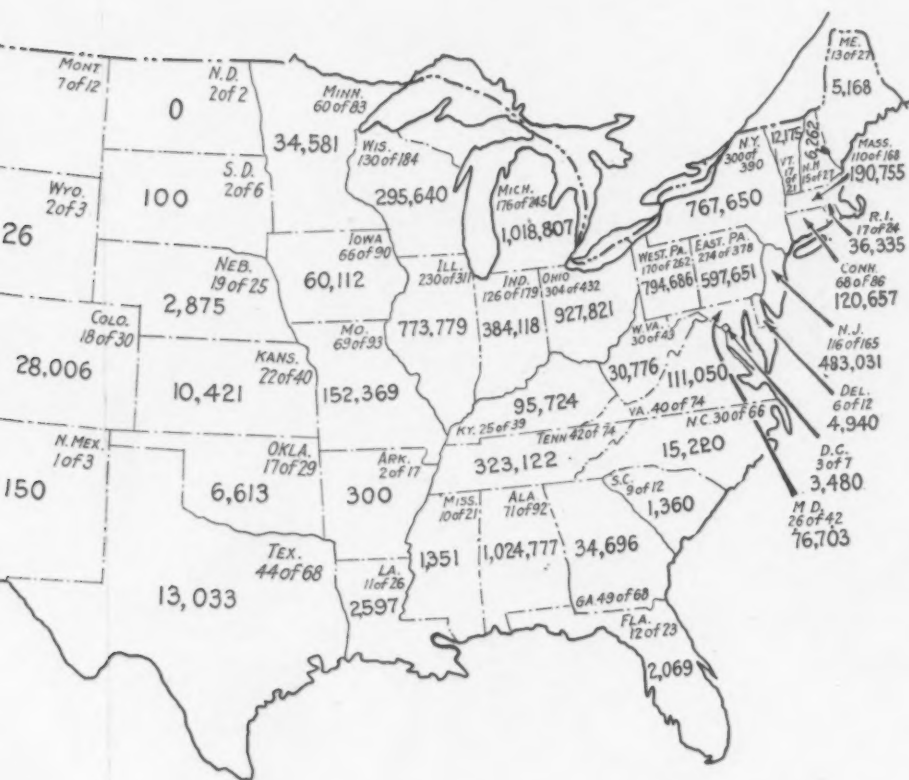
Southeastern States

Virginia	111,050	109,901	185	964	...	...	...	...	54
Kentucky	95,724	91,609	2,500	...	1,615	...	...	...	64
North Carolina	15,220	14,420	...	750	50	...	...	...	46
Tennessee	323,122	300,940	680	21,502	...	...	...	...	57
South Carolina	1,360	1,300	...	60	...	...	...	...	43
Georgia	34,696	34,246	300	150	...	...	...	...	72
Florida	2,069	1,989	75	5	...	...	...	...	55
Alabama	1,024,777	992,686	333	31,758	...	...	...	...	77
Mississippi	1,351	1,351	...	...	...	...	...	...	47
Total	1,609,369	1,548,442	4,073	55,189	1,665	...	...	...	60

Iron Age Survey

United States last year consumed about 88 per cent of the pig iron manufactured for their purposes.

As shown in the accompanying tables, which give details of consumption by States and districts, Pennsylvania was first in the amount of merchant pig iron used last year. Because the State is divided into two rather distinct producing districts, it was separated into a western and an eastern half in the compilation of consumption statistics. The line of division was fixed arbitrarily on the 78th meridian, or slightly west of Altoona. Foundries reporting from eastern Pennsylvania melted 597,651 tons of iron, while those in the western section reported 794,686 tons, a total of 1,392,337 tons for the State as a whole. Alabama was second in consumption with a melt of 1,024,777 tons reported, and Michigan came third, reporting 1,018,807 tons.



Western Pennsylvania, West Virginia, Ohio and Michigan

State	Total Consumption	Foundry and Malleable	Basic and Bessemer	Low Phos.	Charcoal	Silvery	Ma-yari	Misc.	Per Cent of Foundries
Western Pa.	794,686	554,830	186,555	48,818	3,345	962	176	....	65
West Virginia	30,776	17,461	9,284	3,173	858	....	....	....	43
Ohio	927,821	790,905	114,593	15,050	2,979	3,936	358	....	70
Michigan	1,018,807	871,342	37,257	89,185	4,284	15,339	....	*1,400	71
Total	2,272,090	2,234,538	347,689	156,226	11,466	20,237	534	1,400	69

*Special iron.

Indiana, Illinois and Wisconsin

Indiana	384,118	373,150	5,458	630	850	4,030	....	....	70
Illinois	773,779	679,843	74,153	....	11,356	8,277	150	....	74
Wisconsin	295,640	254,586	8,470	23,443	8,431	710	....	....	71
Total	1,453,537	1,307,579	88,081	24,073	20,637	13,017	150	....	72

Pacific Coast States and Hawaii

Washington	6,797	5,581	....	1,216	....	....	....	....	57
Oregon	9,000	8,700	250	50	....	....	....	....	57
California	89,122	77,161	7,517	4,444	....	....	....	....	60
Hawaiian Islands	650	650	....	....	....	....	....	....	100
Total	105,569	92,092	7,767	5,710	....	....	....	....	60
Grand total for entire country	8,559,018	7,382,621	743,623	339,085	47,209	33,254	3,326	9,900	68

*Boys Start in Separate Department and Work Is Closely Supervised—
Cooperation with Trade and Technical Schools Maintained*

fails to show sufficient progress, he is no longer retained by the company. In order to determine the record that each boy is making a close check on his work is maintained. A record card, containing information relating to attendance, wages, premiums, total earnings, work spoiled, tools lost or broken and the number of hours employed, is on file in the office.

By means of its apprentice training course, the Cincinnati Bickford Tool Co. has effectively provided for the future employment needs of its shop. Boys are selected carefully, and it is seldom that an apprentice is dismissed because of failure to live up to requirements. In fact, the entire course is so attractive and the boys receive such valuable training in such pleasant surroundings that the problem confronting the company is not to obtain apprentices, but rather to choose a limited number from the ranks of the applicants.

In addition to the machine shop apprentices the company cooperates with the engineering college of the University of Cincinnati, the Ohio Mechanics Institute and the Cincinnati high schools by employing students from those institutions whose educational program calls for alternating periods of two weeks at school and two weeks in industry.

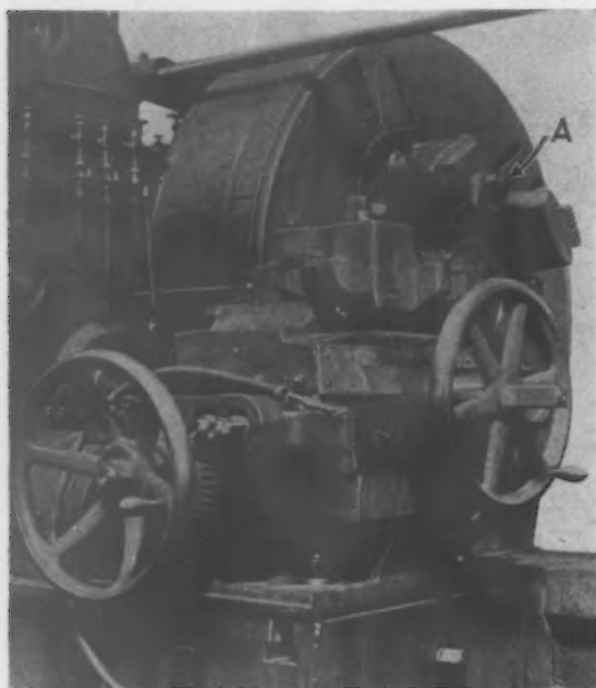
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The Iron Age, June 16, 1927—1753

Improved 52-Ton Car Wheel Lathe

Changed design of the turret tool post, and fully automatic driver dogs, are among the improvements made recently in the No. 4, 52-in. car-wheel lathe built by the Niles Tool Works company division of the Niles-Bement-Pond Co., 111 Broadway, New York.

In the improved tool rest design the turret is provided with a cam locking device, instead of the removable wedge formerly used. All members of the tool rests are of cast steel, with the exception of the lower base piece which is a 30 per cent steel mixture, and all slides of the upper members are lined top and bottom with hardened and ground steel wearing plates. The turret block is a steel casting, the under side of which



A Cam Locking Device Is Provided for the Tool Rests. The driver dogs are fully automatic

is provided with a hardened and ground steel plate. The upper surface of the longitudinal slide is also lined with the same material.

The central turret clamping bolt is now surrounded by a heavy spring and a ball thrust race, so that when this bolt is released most of the weight of the turret block is absorbed by the spring. This is done without actually raising the turret from its seat and, with the aid of the ball thrust, indexing can be accomplished with little effort. An air hose is provided for use in clearing away fine chips and dust accumulated during turning operations.

The new driver dogs are fully automatic in action and have a simplified arrangement for setting radially for different diameters of wheels. There are four dogs to each face plate. There are two taper blocks to each unit, the outer one having serrated teeth and the bottom one supported by the lock bolt. Normally the pressure on the spring at the side forces the serrated block up the incline, but when the face of the wheel sets comes against the serrated edges the dogs are forced down the incline compressing the spring, until all jaws are in contact. It is claimed that by this arrangement the wheels cannot be distorted even though they are not true on the axle.

Another improvement making for more rapid operation of the machine is the speeding up from 35 to 70 in. per min. of the traverse of the right-hand head along the bed. To provide greater chucking range, each pair of axle-journal split bushings now has provision to take care of journals ranging from standard size down to the A. R. A. wear limit, without the use of liners. Other changes include an improved lubricating system for the right-hand head. In the new system the oil is forced from the main pump beside the left-hand head, to the reservoir in the right-hand head, through piping having a telescoping joint running along

the channels of the air hoist. Formerly it was necessary to replenish this reservoir by hand.

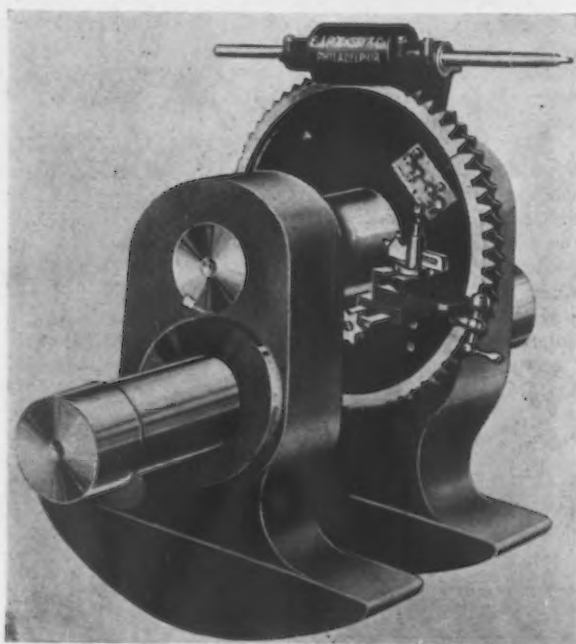
The lathe is regularly equipped to turn trailer wheels having maximum diameter of 11½ in. over the collars, the journals being inserted inside the sliding spindles and the wheels mounted on pointed centers fitting into the axle centers. In a special machine recently built provision was also made whereby wheelsets having outside journals from the minimum up to 10½ in. diameter can be chucked by means of split bushings, this being effected by increasing the diameters of the main and sliding spindles. This feature is offered as optional equipment.

Portable Crankpin Turning Machine

A new portable crankpin turning machine for truing up worn center crankpins has been brought out by E. J. Rooksby & Co., 1042 Ridge Avenue, Philadelphia.

The accompanying illustration shows the unit in use truing up the center crankpin on the center crank axles of new type three-cylinder locomotives. It is equally adaptable, however, for use on center crank engines of any type. The machine consists, essentially, of a stationary and revolving disk, the latter being supported in the stationary disk by a keeper ring which provides a substantial journal bearing, as well as a thrust bearing. The stationary disk is secured to the inside face of the crank cheek by adjusting screws and the studs and clamps.

The revolving disk is driven by a worm gear of ratio suitable for either air drill or electric motor. It carries an arm with a slide block and cross-slide having a tool post and turning tool, giving a feed both ways on the pin provided by a star feed. The cross-slide, for setting to the correct diameter, is similar to the



Crankpin Turning Machine on Crank Axle of Three-Cylinder Locomotive

slide block of a lathe. Both disks and the keeper ring are split in order to permit mounting the machine over the crankpin. The joints between the two halves of the disks are provided with a tongue and groove, which are accurately machined so that they may be readily assembled on the crankpin, at the same time keeping these parts of the machine true.

The machine is bolted to the finished inside cheek of the crank which sets the machine perfectly square with the pin. Provision is made for setting to the original center by a supporting cross-bar with a center, not illustrated, and sleeve having screw adjustment similar to the tailstock of a lathe. This arrangement is stressed as setting the machine perfectly square and central with the original turning of the pin. The capacity is for turning crankpins from 8 in. to 11½ in. in diameter, and from 7½ in. to 9 in. long.

Portable Saw for Use in Crating Bin Building and Other Work

A portable motor-driven saw intended primarily for use as shipping room equipment, but which may be wheeled about and used conveniently in other departments of a plant for carpentry work and salvaging is obtainable from D. W. Onan & Sons, 43 Royalston Avenue, Minneapolis, Minn.

This machine, which is named the "Safety Saw,"



The Saw Stand May Be Moved Conveniently by the Rubber-Tired Wheels Provided

The Motor of the Drilling Machine (at Right) Is Mounted at the Rear and Direct Connected to the Vertical Drive Shaft

may be used in connection with crating, packing, box resizing and salvaging of old crating material; also for a variety of other work such as shelf and bin building, building of additions and partitions. It may also be employed for sorting and cutting stock. For cross cutting and mitering, the lumber is held stationary and the saw is drawn through it. The cutting capacity is up to 15 in. in board, and up to 12 in. in 2-in. material.

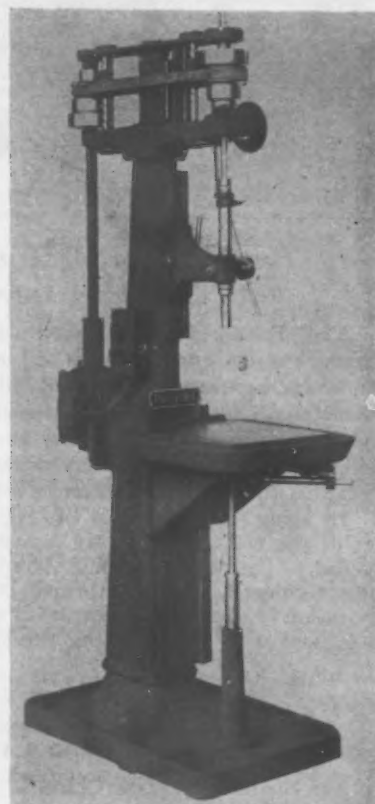
The machine is of steel throughout. The top is of stamped steel reinforced, and measures 24 x 32 in. The stand, which is 38 in. high, is also a steel stamping. The arbor is mounted in ball bearings, which are inclosed in dust proof and oil tight cases. Steel gages for ripping, cross cutting and mitering are provided. An 8-in. all-purpose saw blade is regularly furnished, but rip, cross cut or any standard saw may be used. A larger motor can be furnished for driving saws larger than 8-in., and special saw blades for composition material or metal are available. The arbor beam is of gray iron and is arranged to swing in adjustable bearings to follow the saw slot.

A portable dolly with rubber-tired wheels is provided for the machine. When the machine is to be operated the saw stand is lowered by means of a release lever. One man can move the equipment. Extension side leaves of wood, steel bound and riveted, form an 8-ft. extension table for the machine, the total width of which, with side leaves down, is 26 in. The driving motor is of heavy-duty, fully-inclosed type and is arranged for connection by cord and plug to any standard lighting circuit.

The outlook in the bronze bushing and bearing field is exceptionally bright for the rest of the year, according to P. J. Flaherty, president Johnson Bronze Co., New Castle, Pa. He gives credit to the general industrial field for a good share of the growing demand for finished bronze bushings and bearings.

Adopts New Motor Drive Arrangement for Sensitive Drills

A new type of motor mounting for Footburt-Sipp sensitive drilling machines has been announced by the Foote-Burt Co., Cleveland. In this arrangement a constant-speed motor, which is mounted at the rear of the machine, as shown in the illustration, is connected directly to the vertical driveshaft on which a rear four-step cone pulley is mounted. The drive is then



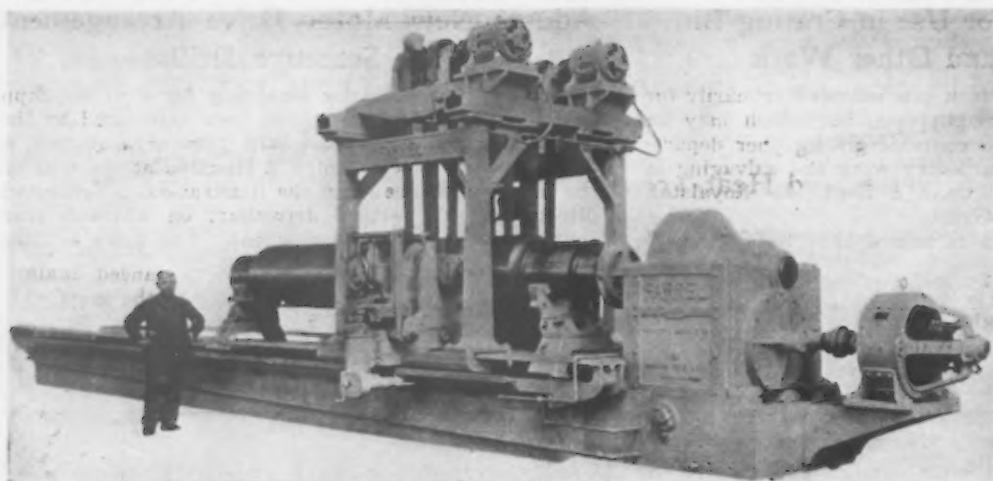
transmitted by an endless belt to the forward cone pulley which is mounted directly on the spindle. Four spindle speeds, 554, 870, 1360, and 2180 r.p.m., are obtainable, to change from one speed to any other being quickly made by turning the quick speed change lever.

The automatic idler pulleys, previously stressed as an important Footburt-Sipp feature, have been retained. They serve to keep the belt tight and pulling to capacity at all times, producing a smooth, steady drive to the spindle. An advantage claimed for the new motor drive is that it permits keeping the center-to-center distance of the spindle down to 8 in. on multiple-spindle machines, by staggering the mountings at the back of the machine. The motors employed are $\frac{3}{4}$ -hp., 1800-r.p.m. standard vertical motors of the completely inclosed type. Being entirely inclosed, the motor is protected from dirt.

The motor mounting above described is available on the largest size of Footburt-Sipp sensitive drilling machine which has a capacity of $\frac{7}{8}$ in. in cast iron. It can be applied to one spindle or any number of spindles up to eight and can be used on machines having overhang of 8 in. or 12 in.

Remarkably Accurate Track Scale

Description of a plate fulcrum master scale installed by the Pennsylvania Railroad at Altoona, Pa., is made, with numerous illustrations, in the reprint of a paper presented at the twentieth National Conference on Weights and Measures, held at the Bureau of Standards, Washington, late in May. The paper was prepared by A. W. Epright, supervisor, scales and weighing, Pennsylvania Railroad. The scale in question has a capacity of 150,000 lb. and is placed in a reinforced concrete pit 11 x 24 ft. inside and 10 ft. 3 in. deep. Tests have shown a maximum error of $\frac{1}{2}$ lb. under a load of 100,000 lb.



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In using the device, the carriage is run to the center of the roll, two nuts are loosened and the scale is turned to the desired amount of crown. The nuts are then tightened, a clutch thrown in and the crowning operation is started. Operation of the crowning device is by means of a cam acting through lifting rods, the

wheels being moved to and from the center of the roll to produce the crown. Concaving, also, may be accomplished accurately with the device, and for straight grinding, the entire device may be disengaged merely by throwing a clutch.

The grinding is performed by two grinding wheels on opposite sides of the roll. Provision is made for compensating for any inaccuracies of the ways. Each grinding wheel is 20 in. in diameter with a 2-in. face and is driven by a 7½-hp. Westinghouse motor. All parts of the machine, including the driving head, bed, ways and neck rests, are of rigid design, and are adequately protected. The driving head is direct-connected to a Westinghouse 25-hp. motor, and is completely inclosed and provided with flood lubrication. Automatic lubrication is also provided for the ways and the feed screw.

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In developing this new design clearances have been made as small as possible, providing a compact trolley. A special low-headroom type is available for use where overhead clearances are extremely limited.

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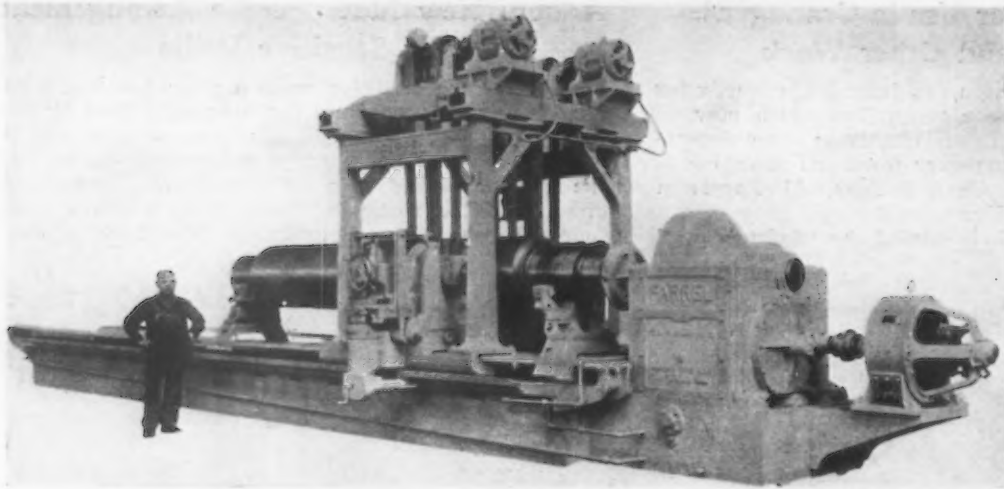
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Business Analysis and Forecast

BY DR. LEWIS H. HANEY

DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

Current Statistical Data, Considered Independently of Trade Opinion, Indicate That:

STEEL production continues above normal, May showing less than the usual seasonal decline.

Finished steel, after the slow downward price movement of the past four months, is holding at about the level of the lowest point in five years.

Pig iron production, still heavily above nor-

mal, showed some of the needed curtailment in May, and more is likely to follow.

It seems likely that the pig iron market will hit bottom by July or August.

Scrap and coke prices are near bottom, but all items of rolled steel are too low by comparison with their raw materials. Steel prices are likely to advance in the fall.

EXAMINATION of the iron and steel situation, at the beginning of June, leaves the outstanding impression that the price structure in the industry rests upon raw materials which are selling at or under their cost of production. Coke is probably selling below cost, and pig iron can be little, if any, above cost. Moreover, the spread in price between these materials and the chief items of finished steel is less than normal. This condition can hardly be long maintained. It is believed that the outlook for general business is sufficiently favorable, and the prospects for stronger fuel markets by August are sufficiently strong, to make a turn in iron and steel prices at about that time quite probable.

Adjusted Ingot Production High

PRODUCTION of steel ingots fell off less than usual in May, that month showing the smallest decline since 1923. As a result, our adjusted production curve rises to the highest point of the current year and represents an annual rate of production slightly higher than that attained in March. It cannot be said, therefore, that there has been any downward trend in ingot production. The adjusted index for May was 113.2 per cent of normal, against 111.2 in April and 112.7 in March. In other words, we estimate steel production to be about 13 per cent above the long-time trend of the country's requirements.

Prices Virtually Unchanged

THE IRON AGE composite price of finished steel averaged 2.365c. in May, against 2.356c. in April. This slight gain in the monthly average was entirely due to the advance in sheets, which had fallen far too low to be profitable to the producers. The advance in sheets has made a little progress toward becoming established. Since, however, sheet prices were obviously out of line and below cost of production, it may be said that the recovery in the index really represents no change in trend. It does show intelligent action by the producers in refusing to sell at an unreasonably low figure, but it does not show recovery in the demand from consumers. In short, as measured by free markets, steel

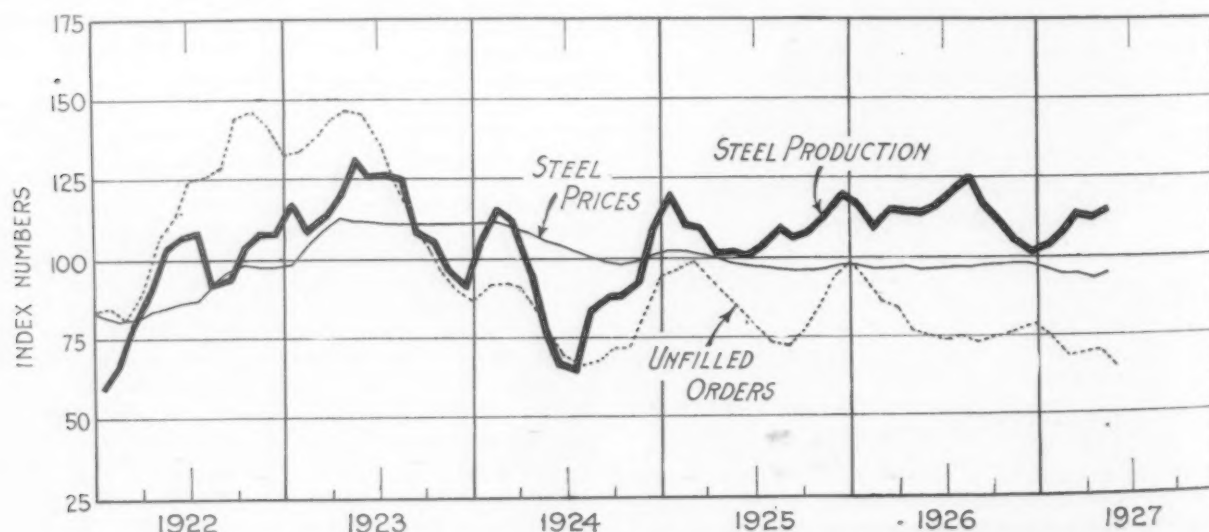


Fig. 1—Ingot Production Fell Off Less in May Than Usual, Placing the Adjusted Curve at the Highest Point of the Year. Unfilled orders declined sharply to the lowest index in some years. Prices of finished steel continue close to their lowest level since 1922

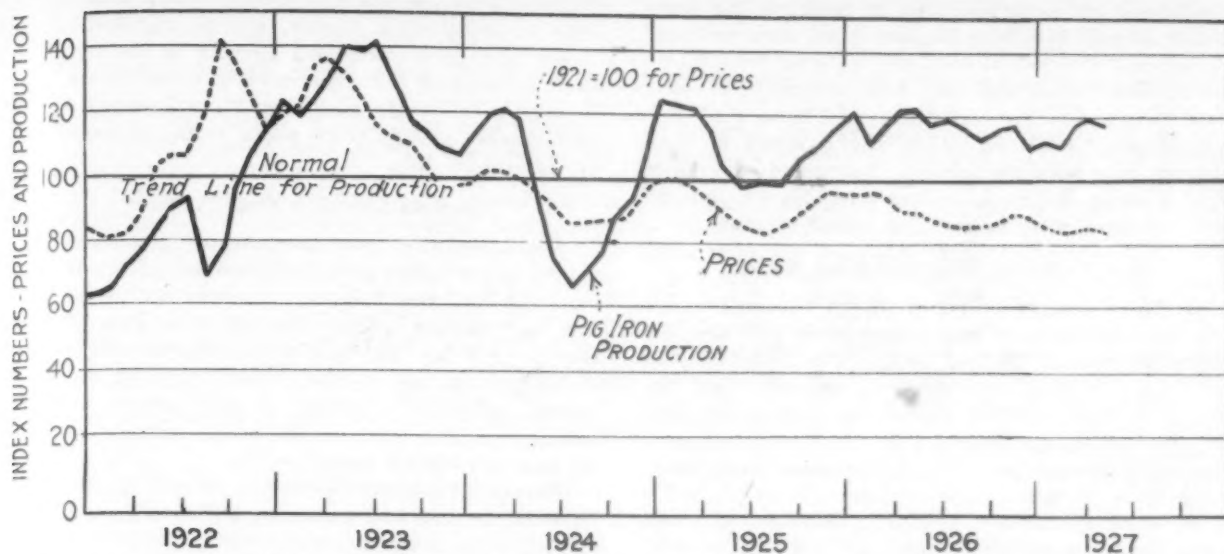


Fig. 2—Pig Iron Production, While Still High in Relation to Steel, Showed in May Some of the Expected Curtailment. A further drop is probable. The price is the lowest, for the season, since 1922, but appears to be becoming a little more stable

prices continue to hang around the lowest point since early 1922. It seems probable that no material change will develop for another month or two.

May Drop in Pig Iron Likely to Be Repeated

Pig iron production in May showed some of the needed curtailment. The output of pig iron usually runs a little higher in May than in April. This year, however, it fell from 3,422,000 tons in April to 3,387,000 tons in May. Accordingly, our production index, after allowing for the usual seasonal change, is only 117.3 per cent of normal in comparison with 119.4 per cent a month ago. That is, the pig iron output is 17 per cent above our estimate of normal. Except for April, the May production was at the highest annual rate of any month this year, or for that matter since July, 1926.

Pig iron production is still too high in comparison with the output of steel ingots and it seems highly probable that further curtailment will be required, to restore a sound condition. The excess has been reduced, the ratio of the average daily production of pig iron to the average daily production of steel ingots declining in May. But it is still too high, in view of the price level of steel products, and the most encouraging thing that can be said is that it would require no

severe readjustment to bring the situation into balance and add strength to the market.

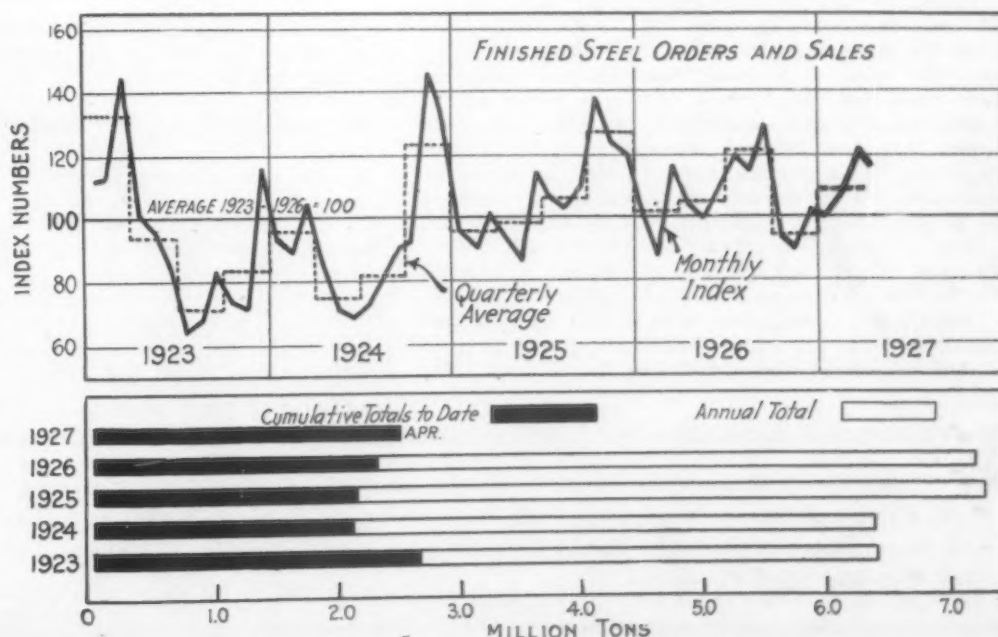
The price of pig iron, contrary to the trend in finished steel, averaged lower in May, being \$19.09 against \$19.19 in April. The May average was almost exactly the same as at the low point reached in July, 1925. It is fair to say that pig iron prices are becoming a little more stable at about the lowest levels in recent years. Further weakness and irregularity are probable, but there is reason to believe that prices will definitely hit bottom by July or August.

Why Steel Output Has Held Large

ONE reason for this opinion is seen in the third chart (which is usually presented in connection with our discussion of the demand for steel). The trend of orders and bookings shows why, in spite of recession in a good many directions, the steel business has been sustained so well. Our composite declined a little in April, but not so much as has been usual in recent years. In fact, April made the highest showing that has occurred in that month of any year covered by the chart and the four-month total is the largest for any year since 1923. This confirms the evidence given by our composite demand curve last week.

Putting this fact together with the high level of

Fig. 3—Finished Steel Orders and Sales in April Showed Less Than the Usual Seasonal Decline, Registering the Highest Point for That Month in Recent Years. The four-month total is the largest since 1923. Orders for structural steel have made the best showing



production, we may see why, in spite of the small volume of unfilled orders, the output has been sustained at such a high level without any material breaking in steel prices during the last four months. The facts show that orders for structural steel have made the best showing relatively, while the bookings of steel castings have been the poorest. Fabricated steel plates show a large decline in orders from March, but did better in April than in the same month of 1926.

Raw Materials Dragging Price Bottom

In examining the price structure this month, we find that coke is at or near bottom levels and that the same may be said of steel scrap. The scrap markets are dead, but it is none the less true that, with the revival in demand which may be anticipated this fall, the price of old material may be expected to advance. Pig iron, while further irregular weakness is probable, is not likely to decline much further.

In spite of the low level of the prices of these materials, all items of semi-finished and finished steel are too low in comparison. This is particularly true of such items as sheets and nails. It therefore seems

reasonable to conclude that, as an advance in scrap and coke is probable by August, and as pig iron would follow suit, steel prices will advance in the fall. Indeed, as soon as this view is verified (assuming it to be sound), a firmer tone should be imparted to the steel market, though there seems to be no probability of this before July.

Expectations of a Price Advance

Indications of greater strength in the general commodity price index, and the possibility of an advancing price level this fall, may be mentioned as supporting the foregoing opinion. In this connection we note that the P-V line has held practically unchanged at a stable level for five months in succession, which is the longest period of stability in the history of that barometer. The most nearly similar periods have in the past preceded a turn.

Buyers of steel will certainly do well to keep the foregoing in mind as a possibility and should watch with especial interest our adjusted index of unfilled orders. If it turns upward decidedly in August it will tell a significant story.

Locomotive Shipments Considerably Below Last Year

WASHINGTON, June 11.—Railroad locomotives to the number of 109 were shipped in May, against 98 in April and 140 in May of last year, according to reports received by the Department of Commerce from the principal manufacturing plants. Of the May shipments 92 were for domestic use, 77 being steam and 15 electric locomotives. Of the 17 shipped abroad, 13 were steam and four electric locomotives. Unfilled orders at the end of May totaled 428 locomotives, of which 408 were for domestic account, 380 being steam and 28 electric locomotives. Of the 20 for foreign account, seven were steam and 13 electric locomotives.

For five months, 481 units have been shipped in 1927, compared with 742 last year. Both domestic and export shipments have declined, domestic from 635 (565 steam and 70 electric) to 385 (318 steam and 67 electric), and export from 107 (77 steam and 30 electric) to 96 (89 steam and 7 electric).

Clinton Furnace Makes Its Last Iron

The blast furnace of the Clinton Iron & Steel Co., Pittsburgh, the only merchant stack in Pittsburgh and the oldest in the Pittsburgh district, has made its last iron. Several years ago the Pittsburgh & Lake Erie Railroad made an offer for the property, which it wanted for enlargement of its Pittsburgh terminal facilities, but the bid, predicated upon the value of the land alone, was below the price asked by the owners, which was based upon the value of a going manufacturing company. Each time that the furnace has been blown out or banked since these negotiations, the story has been current that it would never operate again. The present suspension of the furnace, however, is its final one, as negotiations were recently concluded for the sale of the property to the Pittsburgh & Lake Erie Railroad.

The company has about 14,000 tons of various grades of iron stocked and, it is understood, will have a year in which to dispose of it and dismantle the furnace.

The Clinton furnace was built in 1851 and was last rebuilt in 1914. Its stack dimensions are 78 ft. x 18 ft., and its annual capacity, 110,000 gross tons. The

American Iron & Steel Association's directory of 1875 listed it as owned by Graff, Bennett & Co., the stack dimensions as 45 ft. x 12 ft. and the annual capacity as 12,000 net tons. The 1890 directory listed it under its present ownership, with stack dimensions of 57 ft. x 12 ft. and a capacity of 20,000 net tons.

Soviet Manganese Concession to American Firm to Be Revised

W. A. Harriman & Co., bankers, New York, who hold a concession from the Soviet Union for the removal of manganese ore from the mines of that country, announce that a new contract is being drafted which will be signed shortly, oral agreements having been made on a satisfactory basis. In future there will be a sliding scale for royalties based on the world market price for manganese ore and rising from \$1.50 a ton instead of from the present flat rate of \$3. The obligation to build a wide gage railroad costing perhaps \$9,000,000 was cancelled, the Harriman company agreeing to spend about \$3,000,000 in the reconstruction of present transportation facilities. Another point gained by the American company is that the Nickopol experts, which are handled by a German company, Rabat und Gruenfeld, will hereafter be strictly rationed.

Says Electrical Business Is Better Than General Business

E. M. Herr, president Westinghouse Electric & Mfg. Co., in his remarks at the annual meeting of stockholders called attention to a decrease in the funded debt of the company by the payment of \$6,000,000 Westinghouse Machine Co. bonds and the refunding of \$30,000,000 of parent company bonds from 7 per cent to 5 per cent, materially reducing the fixed charges of the company. Business, he said, was rather quieter than at this time last year, but owing to continuing development, the electrical business on the whole was better than general business. Except for the election of W. L. Mellon, president of the Gulf Oil Corporation, Pittsburgh, as a director to succeed R. B. Mellon, president of the Mellon National Bank, Pittsburgh, the directors whose terms had expired were re-elected.

Schedule of the next installments of the Business Analysis and Forecast, by Dr. Lewis H. Haney, Director, New York University Bureau of Business Research, follows: June 23—General Business Outlook; July 14—Activity in Steel Consuming Industries; July 21—Position of Iron and Steel Producers.

Heavy Decrease in Steel Corporation's Unfilled Orders in May

The fifth successive decrease and the largest one since April, 1926, in the amount of unfilled orders was recorded by the United States Steel Corporation in May. The falling off from April was 405,191 tons, comparing with 97,000 tons in April, 44,000 tons in March, 203,000 tons in February, and 161,000 tons in January, or 505,000 tons for the preceding four months. In April, 1926, the decrease was over 512,000 tons.

The total unfilled business of the corporation on May 31 was 3,050,941 tons, compared with 3,456,132 tons on its books April 30. Previous to January there had been four months of successive increases. A year ago on May 31 the unfilled business was 598,309 tons larger, or 3,649,250 tons. The following table gives the unfilled tonnage by months, commencing with January, 1925.

	1927	1926	1925
Jan. 31.....	3,800,177	4,882,739	5,037,323
Feb. 28.....	3,597,119	4,616,822	5,284,771
March 31.....	3,553,140	4,379,935	4,863,564
April 30.....	3,456,132	3,867,976	4,446,568
May 31.....	3,050,941	3,649,250	4,049,800
June 30.....		3,478,642	3,710,458
July 31.....		3,602,522	3,539,467
Aug. 31.....		3,542,335	3,512,803
Sept. 30.....		3,593,509	3,717,297
Oct. 31.....		3,683,661	4,109,183
Nov. 30.....		3,807,447	4,581,780
Dec. 31.....		3,960,969	5,033,364

The high record in unfilled orders was 12,183,093 tons at the close of April, 1917. The lowest was 2,674,757 tons on Dec. 31, 1910.

Steel Corporation Offers Common Stock to Employees at \$122 a Share

The United States Steel Corporation, in accordance with its annual stock subscription plan, has made available for purchase by its employees a block of 100,000 shares of common stock of the corporation at \$122 a share. The offering is being made somewhat later than usual this year on account of a decision by the finance committee to wait until the new stock occasioned by the recent stock dividend was outstanding. The stock is being offered in the usual manner, the number of shares which each employee may buy depending upon his salary or wages. Shares may be bought on the installment plan, and employees receive a bonus for holding their stock over a period of years.

The stock ownership plan was instituted in 1903, and present holdings of employees including the 40 per cent stock dividend amount to approximately 1,243,300 shares of common and 245,790 shares of preferred stock. There have been no offerings of preferred stock since 1914. The present stock offering expires on July 16.

Wages in Ohio Foundries Show Mixed Tendencies

The last quarterly wage report compiled by the Ohio State Foundrymen's Association for a total of 6724 employees in 87 plants, including gray iron, steel, non-ferrous and malleable foundries, shows declines for three of five important classes of help and slight increases for two. Average wages as of April 1, 1927, were 50.1c. per hr. for common labor, as against 48.9c. on Dec. 1, 1926; for pattern makers they were 73.2c., compared with 72.2c. on Dec. 1, 1926. Average wages of iron molders declined from 80.5c. on Dec. 1, 1926, to 79.9c. on April 1, 1927; those of core makers dropped from 73.2c. to 73.1c., and those of brass molders receded from 85.5c. to 75.2c.

Wages of iron molders, brass molders and pattern makers were lower than in April, 1926; those of core makers and common labor showed gains as compared with a year previous.

Comparison of Average Wage Rates per Hour

Month	Iron Molders	Core Makers	Brass Molders	Pattern Makers	Common Labor
April, 1926.....	\$0.833	\$0.725	\$0.832	\$0.862	\$0.452
July, 1926.....	0.818	0.738	0.850	0.730	0.485
October, 1926.....	0.815	0.709	0.854	0.825	0.473
December, 1926.....	0.805	0.732	0.855	0.722	0.489
April, 1927.....	0.799	0.731	0.752	0.732	0.501

Organization of European Zinc Syndicate Not Yet Completed

WASHINGTON, June 11.—Despite expectations in Europe that impetus would be given the formation of a European zinc syndicate by a meeting of producers' delegates at Brussels in March, no tangible results have apparently been attained as yet, according to advices to the Department of Commerce from William T. Daugherty, trade commissioner, Berlin. German opinion is to the effect that, while Polish and German producers are not unfriendly to such a formation, the position of Belgian and English producers is not altogether plain.

The German press reports world production of zinc at 1,237,800 metric tons in 1926 against 1,000,800 tons in 1913. While European production declined from 680,400 tons to 553,000 tons in this period, American (including Canadian) production is given as increasing from 314,500 to 635,500 tons. Canada produced no zinc before the war. In regulating European production, Polish and Belgian producers are most influential. Belgium accounted for 15.4 per cent of world production in 1926, while Poland's share was 10 per cent.

To Give Course in Industrial Gas Engineering

A short course in industrial gas engineering is to be held at the University of Illinois, from June 20 to July 2. It is being offered by the Illinois Gas Association. Among the faculty engaged to instruct are the following: Prof. W. Trinks, professor of mechanical engineering, Carnegie Institute; Prof. E. E. Ferris, professor of salesmanship, New York University; Prof. F. A. Russell, professor of organization and operation, University of Illinois; Prof. Vincent S. Day, professor of special research, University of Illinois; Kirke Taylor, president National Association of Purchasing Agents, and William A. Darrah, president Continental Industrial Engineering Co.

Combustion, furnace construction and design, industrial heat application, economics of modern factory productions, temperature control and insulating materials will be among the subjects taken up. A. B. Greenleaf, Room 325, Peoples Gas Building, Chicago, is in charge of registration.

New Strip Zinc Mill Completed

The American Zinc Products Co., Greencastle, Ind., has started operation of new strip zinc mills, recently completed, and is now producing ribbon or strip zinc in coils in a full line of gages and sizes. The American Zinc Products Co. has been manufacturing sheet zinc, rolled zinc plates and "Old Chateau" corrugated zinc roofing and siding for the past 10 years. Strip zinc of "special" deep-drawing quality and to meet deep stamping, spinning and forming requirements, as well as the general needs, will be supplied.

Ironton Furnace to Ship by Barge

The Marting Iron & Steel Co., Ironton, Ohio, is making preparations to ship pig iron by water to consuming points along the Ohio River. Installation of the necessary equipment for loading at Ironton is under way, and according to present plans the company will be ready to make deliveries by barge shortly after July 1.

Increase in Mechanical Stokers

Sales of mechanical stokers by 11 establishments are reported by the Department of Commerce to have numbered 97 in May, with a total of 43,601 hp. Except for the March sales, this was the largest for any month since last September. It compares with 26,249 hp. in April and with 48,482 hp. in May of last year.

For the first five months the sales have aggregated 201,411 hp., compared with 240,903 hp. in the first five months of 1926 and with 248,483 hp. in the first five months of 1925.

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Dependability of Steel Company Production Estimates

PRODUCTION of rolled steel in 1926 was 37,000 tons, or 0.1 per cent, higher than THE IRON AGE estimated on Jan. 6, this year. The figures compiled by the American Iron and Steel Institute, now available, serve to show that our canvass is in most particulars within the percentage of error acceptable to statisticians.

In our issue of Jan. 6, emphasis was placed on the large steel takings of the oil industry, that the "output of pipe was phenomenal," but in both plates and pipe our estimates were, even so, under the official tabulations. We expected a falling off in wire products from the previous year of 16,000 tons, but it proved to be 12,000 tons. When it is realized that the companies cooperating have to estimate a part of December in order to get the figures in our hands in time, and that they are in most cases reporting shipments, it is gratifying that the "flash" of the production of the dying year can be depended on while awaiting the complete returns.

This Issue in Brief

Advancing price level in the fall is predicted by stability of the P-V Line. This barometer has been practically unchanged for five months, the longest period without change in its history. In the past nearly similar periods have preceded a turn.—Page 1760.

Cuts casting losses nearly in half by establishing competitive system between groups of molders. A daily record of losses of each molder and each group, together with causes of the failures, is posted by a brass and malleable foundry. Losses are now 4.50 per cent, whereas formerly they were 8.50 per cent.—Page 1746.

Boilers should not be loaded beyond 300 per cent rating. Under-boiling should be avoided in designing industrial power plants. Sufficient capacity should be provided to obviate overloading when one boiler is out for cleaning or repairs.—Page 1750.

Synthetic molding sand is produced for \$2.80 per ton. General Electric executive says losses have been decreased and the surface of castings has been improved by the use of prepared sand.—Page 1747.

Pickling room output increased 600 per cent per man by installing ventilating system. In brass plant two men turn out 3000 lb. of product per day, while formerly seven men were required to handle 1500 lb.—Page 1748.

Watch the silicon content, when adding chromium to cast iron. Too much chromium increases hardness at the expense of strength. As silicon keeps the iron soft, the greatest benefit from the use of chromium may be expected through the adjustments between chromium and silicon content.—Page 1743.

One ton of sheets a minute rolled on new continuous mill. Armco equipment takes care of 720 tons of ingots bloomed in a 10-hr. shift.—Page 1731.

This apprentice training course always has a waiting list. Machine tool builder selects the boys carefully, and after a six months' probationary period those who have made insufficient progress are weeded out.—Page 1753.

Nationwide survey of foundry iron consumption conducted by THE IRON AGE accounts for 88 per cent of the merchant iron available. Pennsylvania leads in tonnage of foundry iron melted. Alabama is second and Michigan third.—Page 1751.

Steel Corporation's unfilled orders lowest in 16 years. On May 31 the unfilled tonnage was 3,050,941, a loss of almost 12 per cent for the month, and the lowest total since December, 1910.—Page 1761.

Believes Germany can again be made one of the most profitable outlets for American metal-working machinery. The best method of getting business, says Government official, is to place at least one trained engineering salesman in the field, together with a competent mechanic to erect and service the machines sold.—Page 1791.

Magnetic and mechanical properties of steel are closely related, Government physicist declares. Statement to the contrary was incorrect, he says, as tests proved only that "Kennelly's law" did not apply. A fundamental investigation, which will reveal the relationship and thus make available the advantages of magnetic analysis, is recommended.—Page 1769.

In melting steel electrically, use three or more voltages, engineer recommends. After cold charging, low or intermediate voltage should be used, followed by high voltage when the burden is semi-molten. Intermediate voltage should complete the melt, with low voltage for remainder of the heat.—Page 1757.

Will iron and steel prices turn upward in August? The outlook for general business is sufficiently favorable to make the upturn quite probable, says Dr. Haney.—Page 1758.

If foundry pig iron is poorer in quality than formerly, is too much scrap in the blast furnace charge the reason? Producers and consumers cooperate to find the answer to the problem raised by increased complaints that iron is "off."—Page 1741.

Slightly concave rolls best for rolling wide, thin sheets. Convexity forces the piece to travel through the roll stands in a straight line as if in a closed pass. Each active pass cuts down the convexity and gives the piece surfaces more nearly approaching parallelism.—Page 1733.

Chaplet blows in using tinned chaplets are avoided by heating and placing in kerosene. Tests indicate that iron for tinned chaplets should be pickled before tinning, and if untreated irons are used as chaplets, they must be well cleaned.—Page 1743.

Advance in scrap and coke prices by August is probable, Dr. Haney believes. Should the advance occur, a firmer tone would be imparted to the steel market.—Page 1760.

BETHLEHEM MERGER CASE

Commerce Commission Likely to Continue the Proceedings

WASHINGTON, June 14.—While consideration is being given by the Federal Trade Commission to the recent decision of the United States Supreme Court in the Eastman Kodak Co. case, as having a possible bearing on the Bethlehem Steel Co. merger case before the commission, it is not believed that the commission will either abandon the case or change its attitude toward

it. It is evident that at least some members, if not all, of the commission favor continuance of the Bethlehem proceedings, now that they have been under way for so long and entailed so much expense and time.

While some commissioners see a parallel between the Eastman case and the Bethlehem case, others hold a different view, and feel that the latter should be contested on whatever merits it may have. In the Eastman case the Supreme Court held that the commission did not have authority to require the Eastman company to divest itself of laboratories which it had been charged were bought with a view to setting up a monopoly in the production of films.

Record Production of Steel Ingots and Castings

MORE than 48,000,000 tons of steel was made in the United States in 1926, according to Statistical Bulletin No. 3 of the American Iron and Steel Institute. The total, including ingots and castings, was 48,293,763 tons, a new high record, exceeding the previous top mark made in 1925 by more than 6 per cent. The previous total was 45,393,524 tons, which was the highest since 1917, when a new record of 45,060,607 tons was made.

Open-hearth steel for the first time passed 40,000,000 tons, reaching 40,678,098 tons. While the acid open-hearth output of 1,024,783 tons was less than half the 1917 production of 2,061,386 tons, the output of basic open-hearth steel at 39,653,315 tons was by far the highest on record. It exceeded by more than 7 per cent the 1925 figure of 37,087,342 tons, which was the previous top mark. Bessemer steel at 6,948,449 tons was nearly 4 per cent above the 1925 total of 6,723,962 tons, but was not much over half the maximum Bessemer production, which was made in 1906 and amounted to 12,275,830 tons.

Electric steel made a new high record last year with 651,723 tons, a gain of nearly 6 per cent over the previous year's record of 615,512 tons, and some 27 per cent above the highest output before that, which was 515,872 tons in 1923. Crucible steel, on the other hand, showed another drop, to 15,493 tons. Except for the

great slump of 1921, this is the lowest crucible steel output of more than half a century.

Ingot production reached 46,936,205 tons, a gain of about 6½ per cent over the previous high figure of 44,140,738 tons, made in 1925. Both open-hearth steel and basic open-hearth steel made new high records for ingots, as shown in the table. Acid open-hearth steel, again as shown, fell far below the wartime figures. Electric steel and ingots made the fourth highest total on record, having been 10,700 tons below the 1925 figure and nearly 78,000 tons below that for 1918.

Steel castings at 1,357,558 tons made the fifth highest year's figure, showing a gain of 8 per cent from 1925, but being well below the figures for 1923 and the three war years. Electric steel castings, however, made a new high record at 326,445 tons. This was a gain of 47,000 tons, or 17 per cent, over the previous record of 279,534 tons, made in 1925.

Alloy steel ingots, at 2,317,313 tons, fell just short of the 1925 record of 2,320,390 tons. Alloy steel castings, however, went 30 per cent ahead of anything in previous years, with 146,101 tons, against 112,583 tons in 1925.

Production of steel by the duplex process, at 2,815,980 tons, was a little above the 2,797,318 tons of 1925, but was far below the output of the three war years.

PRODUCTION OF STEEL INGOTS AND CASTINGS BY PROCESSES.

Years	Open-hearth.			Bessemer.	Crucible.	Elec- tric.	Miscellaneous	Total. Gross Tons.
	Basic.	Acid.	Total.					
1912	19,641,502	1,139,221	20,780,723	10,327,901	121,517	18,309,283	31,251,303	
1913	20,344,626	1,255,305	21,599,931	9,545,706	121,226	30,180,331	31,300,874	
1914	16,271,129	903,555	17,174,684	6,220,846	89,869	24,009,322	23,513,030	
1915	22,308,725	1,370,377	23,679,102	8,287,213	113,782	69,412,152	32,151,036	
1916	29,616,658	1,798,769	31,415,427	11,059,039	129,692	168,918	604,427	773,680
1917	32,087,507	2,061,386	34,148,893	10,479,960	126,716	304,543	495,455	606,607
1918	32,476,571	1,982,820	34,459,391	9,376,236	115,112	511,364	329,444	462,432
1919	25,719,312	1,229,382	26,948,694	7,271,562	63,572	384,452	2,952,34	671,232
1920	31,375,723	1,296,172	32,671,895	8,883,087	72,265	502,152	3,535,42	132,934
1921	15,082,564	507,238	15,589,802	4,015,938	7,613	169,499	945,19	783,797
1922	28,387,171	921,812	29,308,983	5,919,298	28,606	346,039	...	35,602,926
1923	34,665,021	1,234,636	35,899,657	8,484,088	44,079	515,872	...	44,943,606
1924	30,719,523	857,827	31,577,350	5,899,590	22,473	432,526	...	37,931,939
1925	37,087,342	947,146	38,034,488	6,723,962	19,562	615,512	...	45,393,524
1926	39,653,315	1,024,783	40,678,098	6,948,449	15,493	651,723	...	48,293,763

PRODUCTION OF STEEL INGOTS.

1912	19,197,504	712,371	19,909,875	10,259,151	100,967	14,147	542,30	284,682
1913	19,884,465	805,250	20,689,715	9,465,200	103,655	20,973	587,30	280,130
1914	15,936,985	633,382	16,570,367	6,154,964	78,683	15,458	312,22	819,784
1915	21,975,622	968,148	22,943,770	8,194,737	99,026	46,348	331,31	284,212
1916	29,011,146	1,227,832	30,238,978	10,916,248	120,341	126,048	302,41	401,917
1917	31,528,939	1,406,798	32,935,737	10,320,688	122,882	239,632	261,43	619,200
1918	31,970,691	1,347,870	33,318,561	9,215,392	113,782	403,068	219,43	051,022
1919	25,405,347	780,827	26,186,174	7,172,743	62,563	272,942	373,33	694,795
1920	30,926,393	759,102	31,685,495	8,778,107	70,536	346,956	298,40	881,392
1921	14,864,607	290,750	15,155,357	3,977,129	6,877	84,404	317,19	224,084
1922	27,961,190	517,045	28,478,235	5,871,565	27,561	191,057	...	34,568,418
1923	34,093,711	653,337	34,747,048	8,416,576	42,127	279,914	...	43,485,635
1924	30,263,005	454,926	30,717,931	5,846,153	21,096	225,977	...	36,811,157
1925	36,632,060	484,843	37,116,903	6,670,128	17,729	335,978	...	44,140,738
1926	39,172,688	537,285	39,709,973	6,891,502	13,452	325,278	...	46,936,205

PRODUCTION OF STEEL CASTINGS.

1912	443,998	426,850	870,848	68,750	20,550	4,162,231	966,621
1913	460,161	450,055	910,216	80,506	17,571	9,207,344	1,020,744
1914	334,144	270,173	604,317	65,882	11,186	8,551,310	693,246
1915	333,103	402,229	735,332	92,476	14,756	23,064,196	866,824
1916	605,512	570,937	1,176,449	142,791	9,351	42,870	302
1917	558,568	654,588	1,213,156	159,272	3,834	64,911	234
1918	505,880	634,950	1,140,830	160,844	1,330	108,296	110
1919	313,965	448,555	762,520	98,819	1,009	111,510	2,579
1920	449,330	537,070	986,400	104,980	1,729	155,196	3,237
1921	217,957	216,488	434,445	38,809	736	85,095	628
1922	425,981	404,767	830,748	47,733	1,045	154,982	...
1923	571,310	581,299	1,152,609	67,512	1,952	235,958	...
1924	456,518	402,901	859,419	53,437	1,377	206,549	...
1925	455,282	462,303	917,585	53,834	1,833	279,534	...
1926	480,627	491,498	972,125	56,947	2,041	326,445	...

PRODUCTION OF ALLOY STEEL INGOTS AND CASTINGS.

Years	Ingots.	Castings.	Total.	Years	Ingots.	Castings.	Total.
1913	625,430	88,927	714,357	1920	1,591,939	68,353	1,660,292
1914	577,107	69,846	646,953	1921	769,293	40,255	809,548
1915	923,251	97,896	1,021,147	1922	1,614,392	59,104	1,673,496
1916	1,306,157	56,458	1,362,615	1923	2,014,269	92,220	2,106,489
1917	1,576,806	67,529	1,644,335	1924	1,940,461	85,948	2,026,409
1918	1,721,367	66,485	1,787,852	1925	2,320,390	112,583	2,432,973
1919	1,435,816	45,372	1,481,188	1926	2,317,313	146,101	2,463,414

PRODUCTION OF ALLOY STEEL INGOTS AND CASTINGS BY PROCESSES, GROSS TONS, 1926.

Processes.	Ingots.	Castings.	Total.
Open-hearth steel—basic	1,930,963	11,977	1,942,940
Open-hearth steel—acid	59,047	56,735	115,782
Bessemer steel	77,955	12,617	90,572
Crucible steel	6,540	769	7,309
Electric steel	242,808	64,003	306,811
Total	2,317,313	146,101	2,463,414

Examiner Approves Pig Iron Rates Prescribed by Ohio Commission

WASHINGTON, June 14.—Intrastate rates on pig iron in Ohio were given the approval of Examiner W. M. Carney of the Interstate Commerce Commission in a proposed report made public yesterday. The report was not based on any action taken by the railroads serving Ohio subsequent to the decision of the commission late in April reconstructing pig iron rates throughout Central territory, but apparently the seeming conflict between the Ohio Public Utilities Commission, which disallowed increased pig iron rates within that State, and the Federal commission will not develop if the examiner's report is adopted. Instead the rates prescribed by this commission would stand and the investigation would be brought to an end.

The examiner in the syllabus of his report held that rates on pig iron prescribed by the Ohio commission for application between points in Ohio and Canton, Ohio, are not unduly prejudicial to interstate commerce and unduly preferential of intrastate commerce. The rate to Canton was the key to the entire Ohio situation, which has been a matter of considerable contention from the outset between the railroads on the one hand and the producers and consumers of pig iron in Ohio on the other. The examiner in concluding his report made the broad recommendation that the Federal commission find that intrastate rates on pig iron "between points in Ohio have not been shown to cause undue or unreasonable advantage, preference or prejudice as between persons or localities in intrastate commerce, on the one hand, and interstate commerce on the other, or undue, unreasonable or unjust discrimination against interstate commerce."

The report grew out of a petition filed by all of the steam railroads operating in Ohio, under the thirteenth section of the commerce act, asking for an investigation by the Interstate Commerce Commission to determine whether the rates on pig iron and articles taking the same rates required by the Public Utilities Commission of Ohio would cause unjust discrimination, etc., against interstate commerce. The investigation was instituted on Dec. 14, 1925. The Interstate Commerce Commission decision covering pig iron rates in Central territory entailed both increases and decreases, including rates purely within Ohio. The Public Utilities Commission on May 11 announced a decision disallowing proposed increases scheduled to become effective May 30, in Ohio, but permitting proposed decreases to become effective on that date, when new rates in other parts of Central territory became operative. The Ohio commission thus affirmed its previous action in requiring lower rates on pig iron.

The railroads operating in Ohio claimed in their petition to the Interstate Commerce Commission that it would be discrimination against interstate commerce to permit the reduced Ohio rates to become effective in view of the rates in other States which subsequently were given a further change in relationship by the decision of the Interstate Commerce Commission covering rates throughout Central territory. Since that decision, however, the railroads have taken no action, but the petition filed from the outset of the Ohio situation still is valid and it is assumed that if the report of the examiner is accepted by the Interstate Commerce Commission, the reduction in the Ohio rates will be required and the increases denied, and that the investigation, as the examiner recommends, will be brought to an end. The only recourse for the railroads in such a circumstance would be the courts.

Tennessee Products Corporation Entertains Large Delegation

Forty-six members of the iron and steel industry were guests of the Tennessee Products Corporation at Nashville, Tenn., Friday and Saturday, June 10 and 11. The purpose of the visit was to show the mineral and industrial strength of Tennessee as well as to acquaint the visitors with the processes of the Wrigley semi-cold blast charcoal iron and the J. J. Gray, Jr., ferrophosphorus plants. Special cars left Chicago, where some of the visitors had been attending the American foundrymen's convention, while other cars started from Pittsburgh.

Upon arrival at Nashville, the guests were welcomed by Rogers Caldwell, Paul M. Davis, J. J. Gray, Jr., and others. They were given a Southern breakfast at which Mayor Howse gave Hon. W. J. Cummins the key to the city and Col. Luke Lea, a leading Southern publisher, addressed the group on the subject of the "Mineral Wealth of Tennessee." Hon. Benton McMillan concluded the breakfast by discussing possibilities of expansion in the South. The guests were then embarked in special buses and taken to Rockdale, Tenn. Enroute the party halted at Columbia for luncheon and then finished its journey to Rockdale.

The plant at Rockdale, formerly owned and operated by J. J. Gray, Jr., is located on the Sheffield branch of the Louisville & Nashville Railroad and consists of a furnace with modern equipment for securing efficiency, economy and quality. The visitors were shown details of operation, which concluded when a cast of ferrophosphorus was made.

The party then returned to Nashville, where they were guests of Frederick Leake, secretary and director of sales of the Tennessee Products Corporation, at the Belle Meade Country Club. Following the dinner speeches were made by guests and officials of the company. On Saturday after an early breakfast, given by Hon. W. J. Cummins, the party left in private cars for Lyle, Tenn., home of the Wrigley semi-cold charcoal iron plant.

The history of the Wrigley furnace can be traced back as far as the early Eighties. The present furnace site is one which was used for the original operation.

Coordinated with the furnace is a wood distillation plant, carbonizing 200 cords per day, thereby not only furnishing ideal fuel for the blast furnace but also producing large quantities of marketable by-products used in various manufacturing industries. It was indicated by visits to the Johnson Ore Mines, Wrigley quarries and Offield hardwood forests, from which is drawn the supply of cord wood for the distillation plant, that the Wrigley charcoal iron plant will be self-sustaining for 100 years. The furnace produces a fine grade of iron because of the slow process of reducing high-grade brown ores in the presence of an abundance of fuel. Visitors were greatly impressed by the nature of the operations at the plant and were keenly interested in the quality of iron tapped. No detail of explanation was omitted as the visitors, divided in squads, were instructed by the technical staff of the corporation. The party was given a farewell banquet at the Andrew Jackson Hotel and testimonials of appreciation were given by visitors to executives of the Tennessee Products Corporation.

Hudson Valley Company in Controversy with Selling Agent

The Hudson Valley Coke & Products Corporation, New York, manufacturer of pig iron and by-product coke with its plant at Troy, N. Y., has given out the following announcement:

"We have taken over the sales of our pig iron and coke and are now selling, and hereafter will sell, these two commodities direct."

The exclusive sales agent for this company has been E. Arthur Tutein, Inc., with main office at Boston. Leo Oppenheimer, New York, counsel for the Tutein company, reports that his client has a contract for the selling agency of the products of the Hudson Valley Coke & Products Corporation and that the Hudson Valley company cancelled the contract. The contract, however, calls for arbitration in case of a dispute, he says, and action has been taken in the New York Supreme Court to obtain compulsory arbitration. Meanwhile E. Arthur Tutein, Inc., has secured an injunction in the same court to protect its rights.

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The Foundry Pig Iron Problem

FREQUENT have been the complaints since the war, and more particularly in the past year, that foundry pig iron is not satisfactory to users. In some cases standard brands, formerly counted on for their good casting qualities, are said now to need charcoal iron, or some other corrective, in the cupola mixture. Among causes cited as responsible for the reported conditions are too much scrap in the furnace burden, too great a forcing of the furnace, the presence of alloys and the complicated nature of the iron itself.

At Chicago last week an important conference on this subject was held under the auspices of the American Foundrymen's Association. It is reviewed on other pages. The blast furnacemen and foundrymen present offered many suggestions showing conflicting opinions. Some scrap was declared a benefit—at least not harmful. Too much was an admitted evil. It was declared that less wind is now being used relatively than in the "good old days." Cupola practice was blamed as spoiling good pig iron. Others insisted that none of these was the cause.

One suggestion offered at Chicago was that the varieties of pig iron represent identities quite akin to personality in human kind. Certainly good quality iron has well-defined characteristics. Blast furnace practice has changed not a little in recent years: More scrap and less ore, several ores instead of one or two in the same burden, wider hearths and greater pressures, possibilities of wider swings in operating conditions, much larger furnaces and greater output as compared with what obtained only a few years ago—all influencing the character of the product. One of the speakers at Chicago suggested that pig iron is a more complex product than has been commonly thought, with properties not revealed by fracture or analysis, which affect its quality in ways not fully understood.

A complete appraisal of the merits of the problem is difficult. Extended research is needed. Those interested are to be congratulated that, as a result of last week's conference, there is the

offer of cooperation by Government technicians. It is a large job—one that calls for the best thought of all the interests involved.

The New Ashland Sheet Mill

IN referring to the description in this issue of the much talked of but little known Ashland plant of the American Rolling Mill Co., the impulse is to write in praise of so notable a departure in sheet rolling and to enlarge on its economic importance. What checks such expression is a fear of over-stating the case, so epochal seem this and other contributions now being made to the rapid rolling of thin, wide steel sheets and strips.

A few weeks ago THE IRON AGE discussed some of the factors tending to establish at least a temporary equilibrium between the old and the new sheet mills. On the one hand were mentioned the high capital charges of the new plants and the need of a good return on that account. Over against this was put the high unit labor costs of the old plants. Common to all producers were the perils of doing business without considering, and in some cases not knowing, the price levels at which plant suspension would mean less loss than operation.

While consolidations have been broadly recognized as promising some relief for a section of the steel trade that is beset with large capacity and severe competition, mergers of the sheet mills are slow of completion. The reasons for hesitation, financial or what not, involve no disbelief in the need of amalgamation. A new angle to the problem is the possibility of some pooling of interests as between the old and the continuous mills, rather than a line-up that leaves the old mills in one camp, while those which have made the large investment involved in the new method have an immeasurable advantage.

Self-interest would seem to dictate an alignment under which producers having patented processes and devices will enter into arrangements with other companies rather than throw down the gage

of a costly competition which only the fittest could survive.

The revolutionary plant at Ashland has a number of notable features, but its basic and governing idea regards sheet rolling as starting with a flat possessing convex surfaces and as comprehending a succession of passes through roll stands designed to effect a step-by-step reduction in the convexity, until the commercially acceptable parallelism of the surfaces of the sheet is obtained. The pass through each stand thus becomes in effect a pass through a groove, as in general steel rolling. The determination of the desired contours of the surfaces of the rolls followed extended investigation, involving very close temperature, pressure and micrometer measurements and the like.

Contributing to the successful operation of the process are the use of skewed roller tables and a certain slight offsetting of the roll stands with respect to each other, so that in the feeding the sheets are helped to center in the grooves, so to speak. A result which substantiates the theory of the rolling is that the "fish tails" of conventional sheet rolling are here so rudimentary as to be almost negligible, showing the close control of the flow of the steel in the rolls.

Mastery of the practical limitations to the theory underlying the plant represents a long chapter in the years of experimentation at Ashland, and thus becomes an important factor in future wider use of the process. It is conceivable that the question might come up, Why could not the scheme of "proportional convexity" be applied to the strip mill? At Ashland it is held that the continuous as distinguished from the tandem arrangement would entail the watching of the nicety of roll speed control so essential in continuous rolling, whereas with the consecutive system employed in the Ashland mill an important requirement is that sheets must all pass through the same parts of the rolls, and adjacent roll speeds are only roughly related to each other.

Without going further into the trails blazed by the American Rolling Mill Co., such as so controlling temperature and rolling loosely as to avoid "sticking" of the packs, the Ashland plant may well be described as a monumental example of the scientific approach to a major manufacturing problem.

Increasing Service of Iron

IT is a familiar remark nowadays that steel is being made better and better. The usual connotation is that steel, as steel, is being made better in physical qualities, but as to the iron and steel industry as a whole the subject is much longer and broader.

In the first place, this steel which is being improved is a relatively new thing. Manufacture in the United States began with "sowe iron" at Lynn, Mass., in 1645. For a long time the chief ferrous products were iron castings and wrought iron. The swing from wrought iron to hard Bessemer steel in rail manufacture represented a great step in improvement. Later "soft" or "mild" steel supplanted various rolled iron forms. Then the industry was committed to steel, but the iron casting had a great vogue. It is only necessary to observe the small increase in the production of foundry iron in the

past 20 to 25 years, relative to the large increase in steel production, and to observe at the same time the growth in the manufacture of a few classes of iron castings, notably pipe, sanitary ware and radiators, to recognize that what would have been a growth in the iron casting in general has been in rolled steel instead.

Thus in the broad sense the improvement of the ferrous product has extended over a very long period. It is only the improvement in rolled steel that has been relatively recent. From the commercial aspect the improvement in steel, as rendering service in a practical way, has been much broader than is indicated by improvements in strength, ductility and adaptability to heat treatment.

Along one line, there has been great improvement in the form in which steel is offered to the public. Sections have been multiplied and improved. Sheets have been rolled wider, longer and thinner, and now strips are being rolled thinner and wider. Structural sections have been greatly improved, rendering much more service per ton. Pipe has been made larger and larger. Countless things are offered by steel mills unknown in the recent infancy and adolescence of the steel industry.

Along another line, purely commercial, the service of the steel producing industry has increased greatly, namely, in its ability and willingness to make and ship smaller and smaller orders. The steel companies are justly disposed to feel that this form of rendering service to buyers is being carried too far for the good of the producers when it is not accompanied by an adequate charge, but the benefit to buyers, to the public as a whole, is quite obvious.

Currents in Steel Production

FINISHED steel production in 1926, for which official statistics have just been issued, made much the same showing as has been made by the course of total steel production in the past few weeks. We are in a period of remarkably steady and very widely distributed demand. This has been evident in the well sustained production of steel of late, when there was little large lot buying and no activity of outstanding importance in any individual steel consuming line. Similarly, in 1926 most finished steel products had about the same proportions of the general total as obtained in the preceding year.

At the beginning of this year the monthly steel ingot reports had indicated an increase of 6.8 per cent in 1926 over 1925, while the final figures now show 6.3 per cent increase in ingot production, but the finished rolled steel production increased 6.6 per cent. With a slight decline in rolled iron, the total of rolled iron and steel increased 5.95 per cent.

In the individual finished products one finds moderate gains in the majority of lines, in keeping with the slight increase in the total. This would not have been the case if either 1925 or 1926 had shown especially marked activity in particular lines of consumption. Bars, shapes, plates, merchant bars, pipe, sheets and tin plate all had their gains, none being particularly marked.

There is one interesting divergence from expectations entertained in many quarters. The pipe mills appeared to be having an exceptional year in 1926, but the returns show that they gained in ton-

nage only 12 per cent from 1925 and only 1.5 per cent from 1923, previously their record year. There was a large increase in seamless tubes, as was expected—37 per cent, or from 568,190 tons in 1925 to 775,329 tons. The gain seems to have been chiefly in oil country goods, particularly rotary drill pipe.

Two important losses from 1925 to 1926 were in wire products and strips. Last year's wire rod production was 2,722,032 tons, which is 4.3 per cent under 1925, 22.5 per cent under the record tonnage of 1916, and only 2.6 per cent above the total of 1912, 14 years earlier. Production of wire nails made much the same showing, and as nails involve less than one-third of the rod tonnage their lighter movement can be saddled only with their share of the showing made by rods as a whole.

The other notable loss in 1926 production was in strips. The decrease itself was insignificant, from 1,248,635 tons in 1925 to 1,222,089 tons, but strips would be expected to show large gains, being a new product. The production had been only 596,524 tons in 1920. Sheets, often mentioned lately in connection with strips, gained 3.4 per cent, from 4,096,832 tons in 1925 to 4,237,479 tons in 1926. The sheet extension work has had some success in finding new uses for sheets to compensate for the inroads of other forms of roofing.

Two points may be made. First, the slight variations in distribution of demand from year to year, in the different finished products, indicate that the steel industry does not need so much as it formerly needed a large excess of finishing capacity over steel making capacity. Second, the steadiness of demand from month to month suggests that mills can now count upon a fuller average employment of their capacity than they formerly had.

The Decline in Factory Workers

IN its report on the 1925 survey of manufacturing in the United States the Bureau of Census gives numerous important totals that throw light upon our national economy. We may dismiss the grand aggregates, for they introduce manifest duplications. For example, iron and steel and their products are first reported and then to a large extent are reported again under the heads of machinery, transportation equipment, etc. The "value added by manufacture" is the more important total. Excluding 1921, a year of very abnormal depression, the essential data of the biennial censuses beginning with 1919 are as follows:

	1919	1923	1925
Wage earners, thousands	8,990	8,768	8,384
Wages earned, millions	\$10,453	\$10,999	\$10,729
Average wage	1,163	1,254	1,280
Value added, millions	24,748	25,778	26,775
Added per worker	2,853	2,940	3,194
Horse power, thousands	29,298	33,057	35,735

Thus it appears that from 1919 to 1925 the number of factory workers decreased, although the national population and the number of available workers increased. A decrease in the number of factory workers has been possible through the increased use of power. Consequently there appears to have been an increase in the output per worker; but inasmuch as this is expressed in dollars rather than quantitatively there is more or less uncertainty about this demonstration. Anyhow, it does not look as if the increase in efficiency during this period of

six years was so great as frequently has been alleged.

The question that has to be answered is this: Our population is increasing steadily. No doubt as to that. Our available workers are about 40 per cent of our population. No doubt either as to that. It is equally clear that our work-ers employed in agriculture are diminishing. Also in railroading. Also in Federal service. Similarly, it now appears, in manufacturing. What is becoming of the surplus that has been thus set free? Are they occupied in more building? That does not seem likely. Or in rendering more service? Questionable. Or in more enjoyment of the luxury of leisure? We do not pretend to answer these questions; but by economists they ought to be answered.

While the Census statistics of manufactures suggest pertinent inquiry on the above lines, they tend to clarify another important subject, namely, the estimation of the total national income. Some authorities have put this at 65.4 billions for 1919, at 71.9 for 1923 and at 72.9 for 1925, thus showing no great annual increase in recent years. The National Bureau of Economic Research has published estimates quite contradictory, showing huge annual increases in recent years; thus, 67.3 for 1919, against 76.8 for 1923 and 86.5 for 1925, which findings have been emphatically challenged.

The value added by manufacturing is a large part of the total national income, indeed the largest single item. The recently published statistics showing an increase under this head from about 25.8 billions in 1923 to 26.8 in 1925 certainly support the conservative view in respect to the national income rather than that of the economists of the National Bureau of Economic Research.

Practically, the prosperity of 1925-26 has been much exaggerated. Mistaken ideas have resulted from viewing parts of the picture instead of the whole. There is the comforting thought that if we have not risen to a dizzy height there will not be so far to fall if, when and as adversity comes.

IN THE IRON AGE of April 28 reference was made in an editorial paragraph to the fact that the American Iron and Steel Institute reported 15,191 tons of manganese steel rails produced in 1926. This was commented on as indicating a larger use of manganese rails, the output in 1925 having been 2323 tons, against 3471 tons in 1924 and 1720 tons in 1923. According to later information the total of 15,191 tons for 1926 was reported erroneously by the producing company. The greater part of these rails, it now appears, had a manganese content of 1.25 per cent to 1.75 per cent and the American Iron and Steel Institute does not classify anything as a manganese steel rail which contains less than 10 per cent manganese. The corrected figures, which will appear later this year in the institute's report for 1926, will show 3036 tons of manganese steel rails produced last year, rather than 15,191 tons.

April production of electric power by public utility plants in the United States is reported by the Geological Survey at 6370 millions of kwhr. This is a drop from the 6714 of March, but is 10 per cent better than April last year. Almost 40 per cent of the total was produced by water-power and the remainder by fuels.

CORRESPONDENCE

Magnetic and Mechanical Relationships in Steel

To the Editor: My attention has recently been called to an erroneous statement regarding United States Bureau of Standards Scientific Paper No. 546 on the "Magnetic Reluctivity Relationship," which appeared in *THE IRON AGE*, April 28. Through an unfortunate error, this statement was released by the department without obtaining the approval of the author of certain changes in the release as originally prepared. I realize that *THE IRON AGE* is in no way responsible for the erroneous impression that has been given but would appreciate it very much if you would give publicity to the following statement regarding the results of the investigation on the magnetic reluctivity relationship:

The results of the investigation do not lead to the conclusion that there is no relationship between the magnetic properties and the mechanical properties of iron and steel but only that the algebraic expression of magnetic properties, generally known as Kennelly's law, or the reluctivity relationship, does not truly represent the magnetic properties. For this reason we cannot expect to develop such relationship as may exist between magnetic and mechanical properties in terms of the constants in the reluctivity equation.

In the light of the result of many researches carried out independently by several investigators, there can be no doubt that there is a very close connection between the magnetic and mechanical properties of steel. It would be of considerable advantage, therefore, if these relationships could be worked out on a quantitative basis.

The investigation under discussion was undertaken primarily for the purpose of discovering whether or not the reluctivity relationship could be used as the basis of such a quantitative correlation. The fact that the relationship cannot be so used should not by any means be construed as meaning that the correlation does not exist. It is very desirable that fundamental investigation, looking toward the establishment of definite laws of correlation, should be carried on since only through a knowledge of the underlying principles involved can the advantages of magnetic analysis be realized to the fullest possible extent.

R. L. SANFORD,
Physicist.

United States Bureau of Standards.
Washington, June 10.

Theory of the Blast Furnace

To the Editor: In any attempt to explain the outstanding fact of blast furnace operation—the fact that the coke furnace is more gas producer than iron smelter—the disposition of the available hearth heat becomes a matter of paramount importance.

In estimating the amount of heat available for and absorbed in maintaining the hearth temperatures, it would appear to be safe to assume that the gas leaves the top of the combustion zone at the same temperature at which the metal and slag leave the bottom of this zone to sink into the crucible. In making this assumption, allowance is thereby made for an initial difference of temperature between gas and stock which might possibly be conceived to amount to the difference between the theoretical combustion temperature and the observed temperature, a matter of some 500 to 600 deg. C.

In calculating on this basis, there might be a small error in the estimate of heat brought into the combustion zone by the coke carbon. If, at the top of the combustion zone, the stock is 100 deg. C. cooler than the gas going out, then about 50 lb.-cal., due to heating the coke carbon, is accounted for out of a total of some

1110 cal. estimated to be available at 1500 deg. C. with blast at 1200 deg. Fahr. and 5 grains moisture.

It may be noted that a rise of 100 deg. C. in the metal with 50 per cent slag, at specific heats of 0.2 (Richards) and 0.33 respectively, accounts for 36 cal. per lb. of pig, not over 70 cal. per lb. carbon burning with air. While this indicates how it is possible to run a charcoal furnace with cold blast (and a very hot top), it does not go very far toward explaining the disposition of 1110 cal. of hearth heat in a hot blast coke furnace.

It would seem that a constructive effort to explain the great increase in hearth heat consumption in the coke furnace, as compared with charcoal practice, requires a more accurate method for measuring cyanide vapor concentration at 1500 deg. C. than collecting the fume passing through 17 ft. of $\frac{3}{8}$ -in. water-cooled pipe inserted into the furnace. The negative character of such measurements is clearly indicated by the fact, many times observed, that the nitrogen content of the gases increases from less than 60 per cent in the combustion zone to 65 per cent or more at the top of the bosh. This phenomenon, in the absence of other factual explanation of it, would seem to be a true measure of the formation and reversion of volatile nitrogen compounds carried in the gas.

RICHARD FRANCHOT,
Ferro Chemicals, Inc.

Washington, June 11.

Milwaukee Blast Furnace Co. Organized

The Milwaukee Blast Furnace Co., Milwaukee, is the name of a new Wisconsin corporation which has been granted a charter to manufacture and deal in pig-iron and by-products. It represents in effect a reorganization of the defunct Thomas Furnace Co., 744 Kinnickinnic Avenue, Milwaukee, by the bondholders' protective committee. All of the assets were purchased at sheriff's sale for \$300,000 by S. G. Garraway of Chicago on June 2. David W. Bloodgood, secretary of the committee, and other associates in the law firm of Bloodgood, Kemper & Bloodgood, 85 East Michigan Street, Milwaukee, appear as incorporators. The Thomas company was a pioneer blast furnace operator in the Northwest and specialized in low phosphorus pig iron.

Welding Equipment Makers to Be Merged

A merger of the Taylor Welder Co., the Winfield Electric Welding Machine Co. and the Winfield Mfg. Co., all of Warren, Ohio, has been announced and will become effective July 1. A new company will be organized under the name of the Taylor Winfield Corporation with combined assets of over \$350,000. Albertus C. Taylor will be president and general manager; G. P. Gillmer, vice-president; J. H. Ewalt, treasurer, and N. H. Cobb, secretary. The board of directors will be composed of the officers and L. Jennings, Fred W. Platt, W. A. Wilson and W. A. Jones. Work of constructing an addition has been started, which, it is stated, will more than double the present capacity of the plants.

Three Technical Societies to Join with Steel Treating

An attendance of over 25,000, including representatives of Canada and many foreign countries, is expected to participate in the numerous technical sessions to be held and to attend the National Steel and Machine Tool Exposition in Detroit the week of Sept. 19. Four national technical societies interested in the metal industry will convene simultaneously: The American Society for Steel Treating, Institute of Metals, the Society of Automotive Engineers with a production meeting and the American Welding Society.

The Gulf States Steel Co. is working on a program of development and betterment of properties, mainly at Gadsden, which may cost upward of \$3,000,000.

Iron and Steel Markets

Decline in Buying Weakens Prices

Attractive Orders Gain Concessions in Heavy Tonnage

Products—Stability Shown in Sheets and Strips—

Sales of Pig Iron at 50c. Reduction

REDUCTION in number as well as size of new orders in steel in the past week has served to emphasize the mid-year decline. The rate of making steel has not materially changed, but a slowing down of rolling operations is reported from all centers. Production, however, still remains on a higher plane than this time last year.

Buying, devoid of a speculative element, continues to point to a scale of consumption beyond expectations of only a few weeks ago. There is no marked activity among the various well-known steel-using industries, yet so broad are requirements that releases against orders and contracts for mill scheduling have fallen probably not over 10 per cent in tonnage in the past month.

Declining output is relatively more pronounced in Chicago and the South, which until recently have not had the successive curtailments of Pittsburgh and the East. Of the 36 steel-company blast furnaces in the Chicago district, 28 are active, the Steel Corporation having blown out No. 9 stack at South Chicago.

Price concessions in bars, plates and shapes are more widely obtained in competitive territories away from producing centers and on lots attractive on the score of providing mills with economical operations. Reflecting the lower range of prices, weakness has also appeared in the Middle West in rail steel bars.

Sheets and strip steel prices by contrast are firm. Further third quarter buying has been done at the regular prices, and mill insistence on specifying by June 15 on current quarter contracts is adding a large tonnage to mill order books. Some Ohio sheet makers that were quoting on a mill basis have gone back to the Pittsburgh base.

The purchase of 20,000 tons of foundry pig iron by a large sanitary ware maker for various plants brought out a price reduction of 50c. a ton at Valley furnaces, as well as concessions by producers in southern Ohio, southern Illinois and eastern Pennsylvania. Pig iron sales increased at Cleveland, totaling 30,000 tons as compared with 20,000 tons in the previous week, but the gain was at the expense of prices, which have been marked down 50c. for local delivery. Purchases in the Cincinnati district, at 20,000 tons, were the largest so far this year. Current inquiry in the various markets, however, fails to portend an active buying movement for third quarter.

Heavy melting steel has declined 25c. a ton at Pittsburgh, Cincinnati and St. Louis. But at Cleveland the prevailing low prices for scrap are discouraging offerings, and at Pittsburgh, consumers are buying because material is cheap, heavy melting steel being lower than at any time since early 1922.

Two pig iron producers in the Valleys and one at Buffalo are in the market for a total of 50,000 tons of coke a month for the next quarter. From \$3.25 to \$3.50, Connellsville, has been quoted on these inquiries without resulting in sales. Spot furnace coke in small tonnages can still be bought at as low as \$2.75.

Rivet manufacturers have advanced large rivets, in the case of small lot orders, \$5 a ton, or to \$3 per 100 lb., holding the present quotation of \$2.75 only to large buyers. Small lot quotations on small rivets have likewise been raised. Orders for bolts and nuts for the next three months may be entered at today's prices.

Tin plate operations are distinctly lighter than in the past few weeks, mills showing no tendency to produce in anticipation of last half needs.

In pipe, production is partly for stock, as the demand is not sufficiently large to sustain present finishing mill output.

Third quarter contracting for wire and wire products is slower getting under way than a year ago.

Structural steel contracts continue in fair volume, covering 30,000 tons for the week. Projects under negotiation, totaling 27,000 tons, include 7000 tons for a grandstand at Arlington, Ill., and 4000 tons for a tower in Chicago. A mail order warehouse in St. Paul, Minn., will take 3000 tons of concrete reinforcing steel.

Pig iron imports again loomed fairly large, with close to 7000 tons coming in at Philadelphia, mostly from England and India.

A British mill will supply 10,000 tons of rails for an Argentine road.

Both of THE IRON AGE composite prices declined this week, that for pig iron going to \$18.96 a ton from \$19.04 and that for finished steel going from 2.374c. a lb. to 2.367c. Pig iron now stands at the low of the year; it has not been lower in more than five years.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	June 14, 1927	June 7, 1927	May 17, 1927	June 15, 1926
No. 2, fdy., Philadelphia...	\$21.76	\$21.76	\$21.76	\$22.26
No. 2, Valley furnace....	18.00	18.50	18.50	18.00
No. 2, Southern, Cin'tl....	21.69	21.69	21.69	24.19
No. 2, Birmingham.....	18.00	18.00	18.00	21.00
No. 2 foundry, Chicago*..	20.00	20.00	20.00	21.00
Basic, del'd eastern Pa....	20.75	20.75	20.75	21.25
Basic, Valley furnace....	18.00	18.00	18.00	18.00
Valley Bessemer, del'd P'gh	20.76	20.76	20.76	20.76
Malleable, Chicago*	20.00	20.00	20.00	21.00
Malleable, Valley	18.00	18.50	18.50	18.00
Gray forge, Pittsburgh....	19.26	19.76	19.76	19.26
L. S. charcoal, Chicago....	27.04	27.04	27.04	29.04
Ferromanganese, furnace.	90.00	90.00	95.00	88.00

Rails, Billets, etc., Per Gross Ton:

O-h. rails, heavy, at mill.	\$43.00	\$43.00	\$43.00	\$43.00
Light rails at mill.....	36.00	36.00	36.00	34.00
Bess. billets, Pittsburgh...	33.00	33.00	33.00	35.00
O-h. billets, Pittsburgh...	33.00	33.00	33.00	35.00
O-h. sheet bars, P'gh.....	33.50	33.50	34.00	36.00
Forging billets, P'gh.....	39.00	39.00	39.00	40.00
O-h. billets, Phila.....	39.30	39.30	39.30	40.30
Wire rods, Pittsburgh....	42.00	42.00	42.00	45.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.80	1.80	1.90	1.90

Finished Iron and Steel,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia...	2.12	2.12	2.12	2.22
Iron bars, Chicago.....	2.00	2.00	2.00	2.00
Steel bars, Pittsburgh....	1.80	1.85	1.85	2.00
Steel bars, Chicago.....	2.00	2.00	2.00	2.10
Steel bars, New York.....	2.14	2.14	2.19	2.34
Tank plates, Pittsburgh...	1.80	1.80	1.85	1.90
Tank plates, Chicago.....	2.00	2.00	2.00	2.10
Tank plates, New York...	2.09	2.09	2.19	2.24
Beams, Pittsburgh	1.80	1.80	1.80	1.90
Beams, Chicago	2.00	2.00	2.00	2.10
Beams, New York	2.09	2.09	2.14	2.24
Steel hoops, Pittsburgh...	2.30	2.30	2.30	2.50

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Sheets, Nails and Wire,	June 14, 1927	June 7, 1927	May 17, 1927	June 15, 1926
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh	3.00	3.00	2.90	2.95
Sheets, black, No. 24, Chi-				
cago dist. mill.....	3.10	3.10	3.10	3.10
Sheets, galv., No. 24, P'gh	3.85	3.85	3.75	4.85
Sheets, galv., No. 24, Chi-				
cago dist. mill.....	3.95	3.95	3.95	4.05
Sheets, blue, 9 & 10, P'gh	2.25	2.25	2.25	2.30
Sheets, blue, 9 & 10, Chi-				
cago dist. mill.....	2.35	2.35	2.35	2.40
Wire nails, Pittsburgh....	2.50	2.50	2.50	2.65
Wire nails, Chicago dist.				
mill	2.55	2.55	2.55	2.70
Plain wire, Pittsburgh....	2.40	2.40	2.40	2.50
Plain wire, Chicago dist.				
mill	2.45	2.45	2.45	2.55
Barbed wire, galv., P'gh..	3.20	3.20	3.20	3.35
Barbed wire, galv., Chi-				
cago dist. mill.....	3.25	3.25	3.25	3.40
Tin plate, 100 lb. box, P'gh	\$5.50	\$5.50	\$5.50	\$5.50

Old Material, Per Gross Ton:

Heavy melting steel, P'gh.	\$14.75	\$15.00	\$15.50	\$16.00
Heavy melting steel, Phila.	14.00	14.00	14.00	15.00
Heavy melting steel, Ch'go	12.00	12.00	12.25	12.25
Carwheels, Chicago	13.50	13.50	14.25	15.00
Carwheels, Philadelphia ..	15.50	15.50	16.00	17.00
No. 1 cast, Pittsburgh....	15.00	15.50	15.75	16.00
No. 1 cast, Philadelphia...	16.00	16.00	17.00	17.00
No. 1 cast, Ch'go (net ton)	14.50	14.50	16.00	16.00
No. 1 RR. wrot, Phila.....	16.00	16.00	16.50	16.50
No. 1 RR. wrot, Ch'go (net)	11.00	11.00	11.50	11.50

Coke, Connellsville, Per Net Ton at Oven:

Furnace coke, prompt....	\$2.90	\$2.90	\$2.90	\$2.75
Foundry coke, prompt....	4.00	4.00	4.00	4.00

Metals,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York...	12.75	12.87 1/2	13.12 1/2	14.12 1/2
Electrolytic copper, refinery	12.37 1/2	12.50	12.75	13.75
Zinc, St. Louis.....	6.30	6.25	6.00	7.25
Zinc, New York.....	6.45	6.60	6.35	7.60
Lead, St. Louis.....	6.15	6.10	6.30	8.00
Lead, New York.....	6.45	6.45	6.65	8.25
Tin (Straits), New York..	67.75	68.00	67.00	61.00
Antimony (Asiatic), N. Y.	12.50	12.75	12.50	10.50

Pittsburgh

Heavy Steel Products Weaker—Pig Iron and Scrap Decline

PITTSBURGH, June 14.—The declining tendency in the steel business has been at a somewhat more accelerated pace in the past week. Previously the falling off in orders had been in their size rather than in number, but lately there has been a noticeable numerical decrease and it is now a common report that the market is quiet. This development has not materially influenced the rate of ingot production in this and nearby districts, which is still close to 70 per cent of capacity, but has resulted in somewhat lighter rolling mill schedules. This week's operation of the tin plate mills is distinctly lighter than that of the past few weeks, since one large producing company which elected to maintain full schedules over a period when others were diminishing has shut down completely for this week. Most makers of this product have second half contracts, but specifications, as is usual at this time of the year, are light, and there is no tendency to produce in anticipation of orders. Pipe-making capacity is being operated at the recent rate, but part of the production is for stock. There are not sufficiently large demands to sustain other finishing mill operations.

It is the between seasons period in the automotive industry; the farm implement industry has made up all the goods it expects to sell during the remainder of the year and is yet to make a start on its 1928 production; the railroads are buying little or no track material, and structural steel lettings are showing the

ordinary June recession. The relatively dull situation in pipe is largely the result of the excessive production of oil and its effect upon prices and the desire to drill.

The usual accompaniment of a market of this character is price softness, reflecting the effort of manufacturers to maintain economical operations. In the heavy tonnage products this is the case, with what were recently the small-lot prices now applying only on the undesirable specifications and with preferential prices being extended to cover less attractive business. Weakness in hot-rolled bars has extended to the cold-finished bars. But on other products recent prices are holding.

The pig iron market has been awakened from its lethargy by a good-sized purchase of foundry iron for third quarter by a sanitary ware manufacturer, who, however, succeeded in buying at lower prices than recently have been quoted. The scrap market also has dropped, but seemingly has reached a level where consumers regard purchases as safe whether they need supplies immediately or not. The coke market is showing a fair measure of firmness on both spot and third quarter tonnages, but if there is any strength in the coal market it is in forward deliveries, as spot offerings still are too large in comparison with current demand.

Pig Iron.—Prices of foundry iron have failed to withstand the test of sizable demand. Purchases by a local sanitary manufacturer with plants in this district, in the East and in the South, amounting in all to more than 20,000 tons for third quarter delivery, have brought out a definite decline of at least 50c. per ton in the Valley, southern Ohio, St. Louis and eastern Pennsylvania markets, where the purchases were made. Between 6000 and 10,000 tons of Valley iron, all for the

company's Pittsburgh works, for shipment during the third quarter, was divided among four producers. Some of them sold at \$17.75 for No. 2 and \$18 for No. 2X, while others waived the silicon differential and accepted \$18 for both grades. A similar tonnage was purchased at \$21, delivered Louisville, for both No. 2 plain and No. 2X iron, at least half of the iron being purchased in St. Louis. Figured on a basis of all-rail freight rates to destination, the delivered price would mean \$17.72 at St. Louis district furnace and \$18.35 at southern Ohio furnace. The net furnace price, however, will be higher, since some of the iron will move by water. In the East a price of \$20.50, eastern Pennsylvania furnace, was made on approximately 4000 tons of No. 2 and No. 2X iron. Except for this business, the market has shown little or no life. Small lots of foundry iron have been sold at \$18.50, Valley furnace, for No. 2 grade, but there also have been sales of No. 3 foundry at \$17.50, which, allowing for the usual silicon differential, would be equivalent to \$18 for No. 2 grade. One sale of 300 tons of Bessemer iron is noted at \$19, Valley furnace, but there is continued lack of interest in basic iron, the price of which is merely nominal at \$18, Valley furnace. The Jones & Laughlin Steel Corporation has banked one of its Eliza furnaces and now has four of its 12 stacks out of production.

Prices per gross ton f.o.b. Valley furnace:

Basic	\$18.00
Bessemer	19.00
Gray forge	\$17.50 to 18.00
No. 2 foundry	18.00 to 18.50
No. 3 foundry	17.50 to 18.00
Malleable	18.00 to 18.50
Low phosphorus, copper free.....	28.00

Freight rate to the Pittsburgh or Cleveland district, \$1.76.

Ferroalloys.—Spot offerings of spiegeleisen are again rather scant, as increased requirements by some users are greater than the amount released by others. But as spot demands are light, that development is without effect upon prices. New business in the other commonly used ferroalloys is light, and a decreasing rate of steel works operation is having some effect upon specifications on contracts. It is a common belief here that at \$90, Atlantic seaboard, ferromanganese is as low as it is going for the present.

Semi-Finished Steel.—The market is quiet, with new business small and specifications on contracts adversely affected by the prospect of a quiet July. Prices are untested and on billets, slabs and sheet bars are merely nominal. There was some talk a few weeks ago of the possibility of an advance in sheet bars, the thought being that this would be helpful in establishing the advance previously announced in sheets, but sheets seem to have worked up to the higher levels without the support of higher sheet bar prices and when called upon to name prices makers have quoted recent figures. Small lots of wire rods are carrying \$42 to \$43, base Pittsburgh or Cleveland, but the lower figure is the ruling one. There is so little activity in skelp that quotations are simply a basis for negotiation.

Steel and Iron Bars.—Business in steel bars has grown perceptibly smaller in the past week, and if there is a basis for a quotation of 1.90c., base Pittsburgh, it is in single carload lots running to a number

of sizes, on which the mills usually are able to obtain \$1 a ton or more over the ruling market price. Makers of cold-finished screw stock and shafting are feeling the recession in the production of motor cars and are specifying less freely, and bolt, nut and rivet makers are taking fewer bars than they did recently, because their orders are reduced by smaller requirements of the automobile builders and a tendency on the part of jobbers to withhold specifications. The mills want orders. Merchant iron bars are slow and easy.

Structural Steel.—With the mill structural shops actively competing for business, fabricated steel prices are so low that the independent shops cannot pay recent prices for plain material, it is said, and hope to get any of the passing business. There is evidence that they are not being called on to do so. Although there is basis for a price of 1.90c., base Pittsburgh, it is usually on lots bought by the piece instead of by the pound and the ruling small-lot price is 1.85c., while the worthwhile tonnages bring as low as 1.75c. Fabricated steel inquiries are fairly numerous, but there are few shops in this district that are replacing completed orders with new ones.

Wire Products.—Business is tapering off, as it ordinarily does at this time of the year, but the stepdown is slightly less marked than usual because the swells in buying are not so great as they were when buying was at longer range. The fact that consumers and jobbers are disposed to let the mills carry the stocks means that the former must necessarily be in the market continuously and that the variation in the orders is in size rather than in number. The price situation here is fairly steady, and elsewhere it still is described as being no worse than it has been.

Rails and Track Supplies.—Business is slow, but it usually is at this time of the year and dullness therefore creates neither surprise nor alarm. Prices are steady, there being a disposition on the part of producers to maintain them, since there is doubt that concessions would produce business. The depression in the soft coal industry still tells on the demand for light-section rails.

Tubular Goods.—Most of the mills have backlogs in line pipe, but for operation of capacity on other classes they are largely dependent upon current orders and these are hardly sufficient to sustain the present rate of operations, which is placed at between 65 and 70 per cent of capacity. Standard-weight pipe is moving fairly steadily, but in somewhat lessened volume in keeping with lighter building construction, while the oil situation still is unfavorable to the demand for well pipe. There is more or less mill stocking of the standard sizes of both classes of goods. Prices are well maintained. Fairly good buying of boiler tubes for locomotives is reported, and the automobile builders still are taking a fair quantity of mechanical tubing.

Sheets.—A rather good movement of automobile sheets on old orders is noted, but new business in this and all other finishes is still of modest proportions. It is reported that the Ford Motor Co. will be idle for the next 30 days, except in its parts department, and there is no evidence yet that this company is buying steel for the new model recently announced. Some of

THE IRON AGE Composite Prices

Finished Steel June 14, 1927, 2.367c. a Lb.

One week ago.....	2.374c.
One month ago.....	2.367c.
One year ago.....	2.417c.
10-year pre-war average.....	1.689c.

Based on steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets. These products constitute 87 per cent of the United States output of finished steel.

	High		Low	
1927	2.453c.,	Jan. 4:	2.339c.,	April 26
1926	2.453c.,	Jan. 5:	2.403c.,	May 18
1925	2.560c.,	Jan. 6:	2.396c.,	Aug. 18
1924	2.789c.,	Jan. 15:	2.460c.,	Oct. 14
1923	2.824c.,	April 24:	2.446c.,	Jan. 2

Pig Iron June 14, 1927, \$18.96 a Gross Ton

One week ago.....	\$19.04
One month ago.....	19.04
One year ago.....	20.13
10-year pre-war average.....	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1927	\$19.71,	Jan. 4:	\$18.96,	Feb. 15
1926	21.54,	Jan. 5:	19.46,	July 13
1925	22.50,	Jan. 13:	18.96,	July 7
1924	22.88,	Feb. 26:	19.21,	Nov. 3
1923	30.86,	March 20:	20.77,	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base Per Lb.
F.o.b. Pittsburgh mills.....	1.80c. to 1.90c.
F.o.b. Chicago.....	2.00c.
Del'd Philadelphia.....	2.12c. to 2.17c.
Del'd New York.....	2.14c. to 2.19c.
Del'd Cleveland.....	1.99c. to 2.04c.
F.o.b. Cleveland.....	1.80c. to 1.90c.
F.o.b. Birmingham.....	2.05c. to 2.15c.
C.i.f. Pacific ports.....	2.35c.
F.o.b. San Francisco mills.....	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills.....	1.80c. to 1.90c.
F.o.b. Birmingham.....	2.00c.

Rail Steel

F.o.b. mill.....	1.65c. to 1.80c.
F.o.b. Chicago.....	1.90c.

Iron

Common iron, f.o.b. Chicago.....	2.00c.
Refined iron, f.o.b. P'gh mills.....	2.75c.
Common iron, del'd Philadelphia.....	2.12c.
Common iron, del'd New York.....	2.14c.

Tank Plates

	Base Per Lb.
F.o.b. Pittsburgh mill.....	1.75c. to 1.90c.
F.o.b. Chicago.....	2.00c.
F.o.b. Birmingham.....	1.95c. to 2.05c.
Del'd Cleveland.....	1.94c. to 2.04c.
Del'd Philadelphia.....	2.07c. to 2.17c.
Del'd New York.....	2.09c. to 2.19c.
C.i.f. Pacific ports.....	2.25c. to 2.30c.

Structural Shapes

	Base Per Lb.
F.o.b. Pittsburgh mills.....	1.75c. to 1.90c.
F.o.b. Chicago.....	2.00c.
F.o.b. Birmingham.....	2.05c. to 2.15c.
Del'd Cleveland.....	1.94c. to 2.04c.
Del'd Philadelphia.....	2.02c. to 2.17c.
Del'd New York.....	2.04c. to 2.19c.
C.i.f. Pacific ports.....	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

	Base Per Lb.
All gages, narrower than 6 in., P'gh.....	2.30c.
All gages, 6 in. to 12 in., P'gh.....	2.10c.
Nos. 13 and 14 gage, 12 in. to 14 in., P'gh, net.....	2.30c.
Nos. 15 and 16 gage, 12 in. to 14 in., P'gh, net.....	2.40c.
All gages, narrower than 6 in., Chicago, 2.40c. to 2.60c.	
All gages, 6 in. and wider, Chicago, 2.30c. to 2.50c.	

*Mills follow plate or sheet prices according to gage on wider than 14 in.

Cold-Finished Steel

	Base Per Lb.
Bars, f.o.b. Pittsburgh mills.....	2.30c. to 2.40c.
Bars, f.o.b. Chicago.....	2.40c.
Bars, Cleveland.....	2.35c.
Shafting, ground, f.o.b. mill.....	2.55c. to 3.00c.
Strips, up to 12 in., f.o.b. Pittsburgh mill.....	2.25c.
Strips up to 12 in., f.o.b. Cleveland mills.....	2.25c.
Strips up to 12 in., delivered Chicago.....	2.55c.
Stripsheets, 12 in. and wider, Pittsburgh mill.....	3.00c.
Stripsheets, 12 in. and wider, Cleveland mill.....	3.00c.
Stripsheets, 12 in. and wider, Chicago mill.....	3.30c.

*According to size.

*Base price is for 1 to less than 3 tons.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

	Base Per Keg
Wire nails.....	2.50
Galv'd nails.....	4.50
Galvanized staples.....	3.20
Polished staples.....	2.95
Cement coated nails.....	2.50
	Base Per 100 Lb.
Bright plain wire, No. 9 gage.....	2.40
Annealed fence wire.....	2.45 to 2.55
Spring wire.....	3.40
Galv'd wire, No. 9.....	3.00
Barbed wire, galv'd.....	3.20
Barbed wire, painted.....	2.95

Chicago district mill and delivered Chicago prices are \$1 per ton above the foregoing. Birmingham mill prices \$3 a ton higher; Worcester, Mass., mill \$3 a ton higher on production of that plant; Duluth, Minn., mill \$2 a ton higher; Anderson, Ind., \$1 higher.

Woven Wire Fence

	Base to Retailers Per Net Ton
F.o.b. Pittsburgh.....	\$65.00
F.o.b. Cleveland.....	65.00
F.o.b. Anderson, Ind.....	66.00
F.o.b. Chicago district mills.....	67.00
F.o.b. Duluth.....	68.00
F.o.b. Birmingham.....	68.00

Sheets

Blue Annealed

	Base Per Lb.
Nos. 9 and 10, f.o.b. Pittsburgh.....	2.25c.
Nos. 9 and 10, f.o.b. Chicago dist. mill.....	2.35c.
Nos. 9 and 10, del'd Philadelphia.....	2.57c.
Nos. 9 and 10, f.o.b. Birmingham.....	2.35c. to 2.45c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh.....	3.00c.
No. 24, f.o.b. Ch'go dist. mill.....	3.10c.
No. 24, del'd Philadelphia.....	3.32c.
No. 24, f.o.b. Birmingham.....	3.10c. to 3.15c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade.....	4.10c.
No. 24, f.o.b. Pittsburgh, B grade.....	4.00c.

Galvanized

No. 24, f.o.b. Pittsburgh.....	3.85c.
No. 24, f.o.b. Chicago dist. mill.....	3.95c.
No. 24, del'd Philadelphia.....	4.17c.
No. 24, f.o.b. Birmingham.....	3.95c. to 4.05c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh.....	3.10c.
No. 28, f.o.b. Chicago dist. mill.....	3.20c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh.....	4.25c.
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Long Ternes

No. 24, 8-lb. coating, f.o.b. mill.....	4.20c. to 4.30c.
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Tin Plate

Per Base Box

Standard cokes, f.o.b. P'gh district mills.....	\$5.50
Standard cokes, f.o.b. Gary and Elwood, Ind.....	5.60

Terne Plate

(F.o.b. Morgantown or Pittsburgh)

(Per package, 20 x 28 in.)

8-lb. coating, 100	20-lb. coating I.C. \$16.20
lb. base.....\$11.40	25-lb. coating I.C. 17.90
8-lb. coating I.C. 11.70	30-lb. coating I.C. 19.45
15-lb. coating I.C. 14.85	40-lb. coating I.C. 21.65

Alloy Steel Bars

(F.o.b. Pittsburgh or Chicago)

S. A. E. Series	Numbers	Base Per 100 Lb.
2100* (½% Nickel, 0.10% to 0.20% Carbon)		\$3.00 to \$3.15
2300 (3½% Nickel)		4.30 to 4.40
2500 (5% Nickel)		5.50
3100 (Nickel Chromium)		3.30 to 3.40
3200 (Nickel Chromium)		4.75 to 5.00
3300 (Nickel Chromium)		7.00 to 7.25
3400 (Nickel Chromium)		6.25 to 6.50
5100 (Chromium Steel)		3.30 to 3.40
5200* (Chromium Steel)		7.00 to 7.50
6100 (Chrom. Vanadium bars)		4.20 to 4.30
6100 (Chrom. Vanad. spring steel)		3.80

9250 (Silicon Manganese spring steel)	3.20 to 3.25
Carbon Vanadium (0.45% to 0.55% Carbon, 0.15% Vanad.)	4.10 to 4.20
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chrom., 0.15 Vanad.)	4.20 to 4.30
Chromium Molybdenum bars (0.80—1.10 Chrom., 0.25—0.40 Molyb.)	4.25 to 4.35
Chromium Molybdenum bars (0.50—0.70 Chrom., 0.15—0.25 Molyb.)	3.40 to 3.50
Chromium Molybdenum spring steel (1—1.25 Chrom., 0.30—0.50 Molybdenum)	4.50 to 4.75

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in. the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 in. down to and including 2½-in. squares, the price is \$5 a gross ton above the 4 x 4 billet price.

*Not S. A. E. specification, but numbered by manufacturers to conform to S. A. E. system.

Rails

Per Gross Ton

Standard, f.o.b. mill.....	\$43.00
Light (from billets), f.o.b. mill.....	36.00
Light (from rail steel), f.o.b. mill.....	34.00
Light (from billets), f.o.b. Ch'go mill.....	\$36.00 to \$38.00

Track Equipment

(F.o.b. Mill)

	Base Per 100 Lb.
Spikes, ½ in. and larger.....	\$2.80 to \$3.00
Spikes, ½ in. and smaller.....	2.80 to 3.15
Spikes, boat and barge.....	3.25
Tie plates, steel.....	2.25
Angle bars.....	2.75
Track bolts, ½ in. and ¾ in.....	3.90 to 4.00
Track bolts, ¾ in. and smaller, per 100 count.....	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Inches	Steel Black	Galv.	Inches	Iron Black	Galv.
¼	45	19½	¼ to ¾	+11	+39
½ to ¾	51	25½	¾	22	2
¾	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

¼	41	24½	¼ to ¾	+19	+54
½ to ¾	47	30½	¾	21	17
¾	53	42½	¾	28	12
¾	58	47½	1 to 1½	30	14
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	15
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

To the large jobbing trade the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to large jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel	Charcoal Iron
2 to 2½ in.....	27
2½ to 2¾ in.....	37
3 in.....	40
3¼ to 3¾ in.....	42½
4 to 18 in.....	46
1½ in.....	1½
1¾ to 1½ in.....	1½
2 to 2½ in.....	2
2½ to 3 in.....	2
3¼ to 3 in.....	2
4 to 4½ in.....	9

Beyond the above discounts, 7 fives extra are given on lap welded steel tubes and 2 tens to 2 tens and 1 five on charcoal iron tubes.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.....	60	3 in.....	45
1¼ to 1½ in.....	52	3¼ to 3½ in.....	47
1½ in.....	36	4 in.....	50
2 to 2½ in.....	31	4½, 5 and 6 in.....	45
2½ to 3 in.....	39		

Hot Rolled

2 and 2½ in.....	37	3¼ and 3½ in.....	53
2½ and 3 in.....	45	4 in.....	56
3 in.....	51	4½, 5 and 6 in.....	51

Less carloads, 4 points less. Add \$8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Per Cent Off List

Carbon, 0.10% to 0.30%, base.....	55
Carbon, 0.30% to 0.40%, base.....	50
Plus differentials for lengths over 18 ft. and for commercially exact lengths. Warehouse discounts on small lots are less than the above.	

the other companies that did not do well in the first half of the year are looking for good last half business, but the outlook for none of the companies is yet sufficiently clear for them to be buying much steel. There are suggestions that all makers are not adhering to 3c., base Pittsburgh, on black sheets, but the fact that business is being placed at that price indicates that if there are departures they are not numerous. It is granted that business is light, but generally it is at the full quotations.

Tin Plate.—Mill operations are down slightly this week, chiefly as a result of a brief suspension by the Jones & Laughlin Steel Corporation of its 32 mills. The American Sheet & Tin Plate Co. is running at slightly under 80 per cent, while the Weirton Steel Co. has all of its tin mills in operation and other producers are at a rate to suggest that total capacity is about 75 per cent engaged. All companies have second half contracts on their books, but there is little rush for shipments, and with no danger of a coal shortage growing out of the coal strike, there is not much disposition to produce ahead of specifications. Tin plate production usually is greater in the first five months of each year than in the other seven, and this year does not promise to be an exception. Dullness just now is natural, since it is too early to tell accurately the packers' can requirements. Prices are firm.

Cold-Finished Steel Bars and Shafting.—Weakness in prices of hot-rolled bars is being reflected in those for cold-finished steel bars, and 2.30c., base Pittsburgh, which hitherto has been regarded as the large-lot price, is now fairly common on small lots. There has been a considerable shrinkage in the size of the orders, and lately the number of them has been dwindling, making producers more eager for business.

Plates.—While there is a fairly good run of business, it is not sufficient to give all mills an economical operation and there is enough competition so that smaller orders than recently would have commanded the price now are going at 1.80c., base Pittsburgh. It is a small lot that now brings as high as 1.90c.

Hot-Rolled Flats.—Consumers of strips are specifying well against second quarter contracts, but new business does not amount to much, since important consumers do not yet fully know their future requirements. Some third quarter contracting is reported at the current prices, but there is no specifying.

Cold-Rolled Strips.—A fair amount of third quarter contracting is reported at the full base price of 3.25c., Pittsburgh or Cleveland, for lots of 1 to less than 3 tons, with deductions for larger lots down to 3c. for lots of 18 tons or more, but the orders as yet are unaccompanied by specifications. Current demands are light, but there is a good movement on second quarter contracts carrying lower prices than now prevail.

Bolts, Nuts and Rivets.—Presumably for the purpose of stimulating contracting, leading makers of large rivets have announced a base price of \$3 for ½-in. and larger to non-contracting buyers. Current business is rather light in that product and in bolts

and nuts. Producers are preparing to open their books for third quarter business at unchanged prices.

Concrete Bars.—An encouraging volume of business is in sight locally, but actual orders run to small tonnages. On the smaller tonnages, makers are holding to 1.90c., base Pittsburgh, but that price is being shaded on the worthwhile lots.

Coke and Coal.—Two Valley pig iron producers and one in the Buffalo district are in the market for third quarter tonnages. Almost 50,000 tons a month is involved in these inquiries, which have brought out quotations of \$3.25 to \$3.50 per net ton at Connellsville ovens. The furnace interests seem to think they should do better on prices, and the business still is pending. Spot furnace coke can still be had at \$2.75 for small tonnages from small producers who have been able to secure men on the November, 1917, scale of wages, but those paying the higher scale want \$3. The offerings are small, but the demand is even smaller. Spot foundry coke holds at recent prices. Some interest is noted in future supplies of coal, but the spot market is dull and easy under heavy offerings.

Old Material.—Prices have slipped on practically all grades of scrap since a week ago, but at the lower levels there is some evidence of greater consumer interest. One steel company, chiefly because it regarded the price as cheap, bought 10,000 tons of heavy melting steel at \$14.75 to \$15. No considerable activity has developed in other directions, and based upon present signs, the various branches of the industry which consume scrap will not need much in the next 30 or 45 days. But a consideration that may influence purchases is that the market, as typified by heavy melting steel, has not been so low as it is now since the early part of 1922, when the steel industry was emerging from the depression of the previous year.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Furnace Grades:

Heavy melting steel.....	\$14.75 to \$15.00
Scrap rails	14.00 to 14.50
Compressed sheet steel.....	13.75 to 14.25
Bundled sheets, sides and ends...	12.75 to 13.25
Cast iron carwheels.....	15.50 to 16.00
Sheet bar crops, ordinary.....	15.00 to 15.50
Heavy breakable cast.....	14.00 to 14.50
No. 2 railroad wrought.....	14.50 to 15.00
Heavy steel axle turnings.....	14.00 to 14.50
Machine shop turnings.....	10.50 to 11.00

Acid Open-Hearth Furnace Grades:

Railroad knuckles and couplers..	16.75 to 17.00
Railroad coil and leaf springs...	16.75 to 17.00
Rolled steel wheels.....	16.75 to 17.00
Low phosphorus billet and bloom ends	19.00 to 19.50
Low phosphorus, mill plate.....	18.50 to 19.00
Low phosphorus, light grade.....	16.75 to 17.00
Low phosphorus sheet bar crops...	18.50 to 19.00
Heavy steel axle turnings.....	14.00 to 14.50

Electric Furnace Grades:

Low phosphorus punchings.....	17.50 to 18.00
Heavy steel axle turnings.....	14.00 to 14.50

Blast Furnace Grades:

Short shoveling steel turnings...	10.50 to 11.00
Short mixed borings and turnings	10.50 to 11.00
Cast iron borings.....	10.50 to 11.00
No. 2 busheling.....	10.50 to 11.00

Rolling Mill Grades:

Steel car axles.....	19.50 to 20.00
No. 1 railroad wrought.....	11.50 to 12.00

Cupola Grades:

No. 1 cast.....	15.50 to 16.00
Rails 3 ft. and under.....	17.00 to 17.50

Malleable Grades:

Railroad	14.50 to 15.00
Industrial	14.00 to 14.50
Agricultural	13.50 to 14.00

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes.....	2.90c.
Reinforcing steel bars.....	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons.....	3.60c.
Squares and flats.....	4.10c.
Bands	3.60c. to 3.65c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24 gage), 25 or more bundles	3.75c.
Galvanized sheets (No. 24 gage), 25 or more bundles	4.60c.
Blue annealed sheets (No. 10 gage), 25 or more sheets	3.30c.
Spikes, large	3.30c. to 3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, ¾ in. and smaller, per 100 count, 62½ per cent off list	
Machine bolts, per 100 count. 62½ per cent off list	
Carriage bolts, per 100 count. 62½ per cent off list	
Nuts, all styles, per 100 count, 62½ per cent off list	
Large rivets, base per 100 lb.....	\$3.50
Wire, black soft annealed, base per 100 lb..	2.90
Wire, galvanized soft, base per 100 lb.....	2.90
Common wire nails, per keg.....	\$2.80 to 2.90
Cement coated nails, per keg.....	2.85 to 2.95

Large Building Construction Continues

Building and engineering contracts in May amounted to \$552,350,000 in the 37 States east of the Rocky Mountains, according to figures collected by F. W. Dodge Corporation. The area includes about 91 per cent of the country's building volume. The amount was 9 per cent under April and was ½ per cent above May of last year. For the first five months the total has been \$2,555,515,000, or 1 per cent below the first five months of 1926.

Residential buildings still hold the lead with \$219,980,000 in May, or 40 per cent of all construction. Public works and utilities furnished \$111,367,000; commercial buildings, \$72,541,000; industrial buildings, \$44,889,000, and educational buildings, \$34,545,000.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and over.....	\$33.00
Rerolling, under 4-in. to and including 1½-in.	\$33.50 to 34.00
Forging, ordinary	39.00 to 40.00
Forging, guaranteed	44.00 to 45.00

Sheet Bars

	Per Gross Ton
Open-hearth or Bessemer.....	\$33.50 to \$34.00

Slabs

	Per Gross Ton
8 in. x 2 in. and larger.....	\$33.00
Smaller than 8 in. x 2 in.....	\$33.50 to 34.00

Skelp

	Per Lb.
Grooved	1.80c. to 1.90c.
Sheared	1.80c. to 1.90c.
Universal	1.80c. to 1.90c.

Wire Rods

	Per Gross Ton
*Common soft, base.....	\$42.00 to \$43.00
Screw stock	\$5.00 per ton over base
Carbon 0.20% to 0.40% ..	3.00 per ton over base
Carbon 0.41% to 0.55% ..	5.00 per ton over base
Carbon 0.56% to 0.75% ..	7.50 per ton over base
Carbon over 0.75%	10.00 per ton over base
Acid	15.00 per ton over base

*Chicago mill base is \$42.50 to \$44. Cleveland mill base, \$42 to \$43.

Prices of Raw Materials

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron.....	\$4.55
Old range non-Bessemer, 51.50% iron.....	4.40
Mesabi Bessemer, 51.50% iron.....	4.40
Mesabi non-Bessemer, 51.50% iron.....	4.25
High phosphorus, 51.50% iron.....	4.15
Foreign Ore, c.i.f. Philadelphia or Baltimore	

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria.....	10.50c.
Iron ore, Swedish, average 66% iron, 9.75c. to 10.00c.	

Manganese ore, washed, 52% manganese, from the Caucasus.....	40c. to 41c.
Manganese ore, Brazilian, African or Indian, basis 50%	40c. to 42c.
Tungsten ore, high grade, per unit, in 60% concentrates	\$11.00 to \$11.50

	Per Gross Ton
Chrome ore, Indian basic, 48% Cr ₂ O ₃ , crude, c.i.f. Atlantic seaboard.....	\$22.50

	Per Lb.
Molybdenum ore, 85% concentrates of MoS ₃ , delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	\$2.90 to \$3.00
Foundry, f.o.b. Connellsville prompt	4.00 to 4.50
Foundry, by-product, Ch'go ovens	9.75
Foundry, by-product, New England, del'd	12.00
Foundry, by-product, Newark or Jersey City, delivered.....	9.59 to 10.77
Foundry, Birmingham	5.50
Foundry, by-product, St. Louis.....	9.75

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	\$1.30 to \$1.90
Mine run coking coal, f.o.b. W. Pa. mines	1.70 to 1.90
Mine run gas coal, f.o.b. Pa. mines	2.00
Steam slack, f.o.b. W. Pa. mines.....	1.25
Gas slack, f.o.b. W. Pa. mines.....	1.40 to 1.50

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd.....	\$90.00
Foreign, 80%, Atlantic or Gulf port, duty paid	90.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	\$36.00 to \$37.50
Domestic, 16 to 19%	36.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	\$85.00 to \$87.50
75%	145.00

10%	.....	145.00
	<i>Per Gross Ton</i>		
	<i>Furnace</i>		
10%\$35.00	12%\$39.00
11%37.00	14 to 16%\$45 to 46.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace			
Per Gross Ton		Per Gross Ton	
.....\$34.00	12%	.....\$38.00	
.....36.00			

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace			
Per Gross Ton			Per Gross Ton
.....	\$26.50	10%	.....\$32.00
.....	27.50	11%	.....34.00
.....	28.50	12%	.....36.00
.....	30.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal, del'd	\$1.00 to \$1.05
Ferrocromium, 4 to 6% carbon and up, 65 to 70% Cr, per lb. contained Cr. delivered, in carloads.....	\$11.50c.
Ferrovandium, per lb. contained vanadium, f.o.b. furnace	\$3.15 to \$3.65
Ferrocobalt, 15 to 18%, per net ton, f.o.b. furnace, in carloads.....	\$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per net ton.....	\$91.00
Ferrophosphorus, electric, 24%, f.o.b. Aniston, Ala., per net ton.....	\$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines.....	\$17.00 to \$18.00
No. 2 lump, Illinois and Kentucky mines.....	\$20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid.....	\$16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2¼% silica, f.o.b. Illinois and Kentucky mines.....	\$32.50

Fire Clay

	Per 1000 f.o.b. Works
First Quality	
Second Quality	
Pennsylvania	\$43.00 to \$46.00
Maryland	43.00 to 46.00
New Jersey	50.00 to 65.00
Ohio	43.00 to 46.00
Kentucky	43.00 to 46.00
Missouri	43.00 to 46.00
Ground fire clay, per ton	7.00

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	\$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton.....	\$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	\$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00

Chrome Brick

	Per Net Ton
Standard size	\$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

	Per 100 Pieces
(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)	
Machine bolts	70
Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads.....	70
Hot-pressed nuts, blank or tapped, square.....	70
Hot-pressed nuts, blank or tapped, hexagon.....	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	6.75c. to 6.50c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.
*Bolts with rolled threads up to and including ¾ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts.....	70
Semi-finished hexagon castellated nuts, S.A.E.....	70
Stove bolts in packages.....	80, 10 and 5
Stove bolts in bulk.....	80, 10, 5 and 2½
Tire bolts	60 and 5

Large Rivets

	Base per 100 Lb.
(½-In. and Larger)	
F.o.b. Pittsburgh or Cleveland.....	\$2.75
F.o.b. Chicago	2.85

Small Rivets

	Per Cent Off List
(¾-In. and Smaller)	
F.o.b. Pittsburgh	70, 10 and 5
F.o.b. Cleveland	70, 10 and 5 to 70 and 10
F.o.b. Chicago	70, 10 and 5 to 70 and 10

Cap and Set Screws

	Per Cent Off List
(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)	
Milled cap screws.....	80, 10 and 10
Milled standard set screws, case hardened,	80 and 10
Milled headless set screws, cut thread.....	80
Upset hex. head cap screws, U.S.S. thread.....	85 and 5
Upset hex. cap screws, S.A.E. thread.....	85 and 5
Upset set screws.....	80, 10 and 10
Milled studs	70 and 5

Chicago

Steel Output Down to 80 Per Cent— Another Blast Furnace Put Out

CHICAGO, June 14.—Steel demand, which continues to decline from the rate maintained in May, has brought further curtailment both in ingot production, now at 80 per cent in the Chicago district, and in blast furnace operations. The Steel Corporation has blown out the No. 9 stack at South Chicago, leaving 20 out of its 27 furnaces active. The total count of active steel mill stacks in this territory now stands at 28 out of 36.

Nevertheless, new sales in the past week, largely for delivery in the third quarter, were in fair volume, the total being the best for any week in the last four. Specifications for steel also are showing improvement, being 80 per cent heavier than in the previous week, but they are still not in sufficient volume to check the gradual reduction in mill operations. Though fresh inquiry is of fair proportions, there is little doubt that resistance to prices on the part of buyers is growing stronger. Bars, plates and shapes are weak at 2c., Chicago, a few scattered attractive purchases having been made at 1.90c. Chicago producers are freely quoting 1.90c., mill, for delivery East, South and Southwest.

Building construction to date has not reached the volume of a year ago, and the seasonal slump has forced fabricators to cut output 10 per cent in the week. Fresh inquiries for 7000 tons have been added to the long list of pending projects. It is reported that the Chicago & North Western is quietly taking preliminary steps toward the purchase of 1000 box cars. Definite new inquiries for railroad equipment include 20 interurban electric cars for the Chicago, North Shore & Milwaukee.

Pig Iron.—Hesitancy on the part of buyers to place forward contracts is indicated by the fact that spot sales continue in good volume and third quarter sales for the week total less than 15,000 tons. Inquiry for future delivery is sluggish, there being no rush to cover near the end of the quarter, as has sometimes been the case in the past. Current shipments indicate that the foundry melt in this district is fairly well maintained. A Chicago user is making inquiry for 2000 tons of foundry iron for delivery in the third quarter, and a melter to the east will take 400 tons. It is reported that term contracts similar to those now in force on malleable iron are being offered to users of foundry iron. The silvery market is showing more life, a buyer east of Chicago having taken 300 tons of the 8 per cent grade and another user, 100 tons of the 7 per cent grade. Southern iron is being quoted at \$18, base Birmingham, but users show no interest in additional requirements.

Prices per gross ton at Chicago:

Northern No. 2 foundry, sil. 1.75 to 2.25	\$20.00
N't'n No. 1 fdy., sil. 2.25 to 2.75	20.50
Malleable, not over 2.25 sil.	20.00
High phosphorus	20.00
Lake Superior charcoal, averaging sil. 1.50	27.04
Southern No. 2 fdy. (all rail)	24.01
Southern No. 2 (barge and rail)	22.18
Low phos., sil. 1 to 2 per cent, copper free	\$31.50 to 32.00
Silvery, sil. 8 per cent	33.29
Bessemer ferrosilicon, 14 to 15 per cent	46.79

Prices are delivered at consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—Demand for ferroalloys is dull, and new sales are few in number and small in tonnage. Carlots of ferromanganese are bringing \$90, seaboard, or \$97.56, delivered. Specifications for ferrosilicon are lighter, and no spot purchases are reported this week. Spiegeleisen is quiet at \$42.56 to \$43.76, delivered, for the 18 to 22 per cent grade.

Prices delivered Chicago: 80 per cent ferromanganese, \$97.56; 50 per cent ferrosilicon, \$85 to \$87.50; spiegeleisen, 18 to 22 per cent, \$42.56 to \$43.76.

Plates.—Orders for plates are more numerous, but

they do not permit mill operations at more than 75 per cent of capacity. Specifications against the recent New York Central car purchase are being forwarded by shops. Since the Illinois Central order for 4500 cars was distributed among eight car builders, steel producers face a loss of some of the tonnage expected because of the fact that a relatively large number of stocks will be drawn on for a portion of the steel required. Some interest is still being shown in oil tankage. A Mid-Continent oil producer is in the market for 4500 tons of plates, and 1500 tons is being figured for San Angelo, Tex. Mill prices in the Chicago district are unsettled. The spread of \$3 to \$4 between Pittsburgh and local prices is more than the market will bear in territory just outside of Chicago and in the Southwest, where Chicago producers are naming 1.90c., base local mills. In Chicago and to the north and west 2c., Chicago, is still the common quotation. Users are having little difficulty in obtaining deliveries desired.

Mill prices on plates per lb.: 2c., Chicago.

Structural Material.—Structural business is of moderate proportions, contracts for the week totaling 6700 tons and fresh inquiry calling for 7000 tons. The Santa Fe Railroad has awarded 2800 tons to McClintic-Marshall Co., for shops at Cleburne, Tex., and the American Bridge Co. has taken 2100 tons for a bridge at Bellefontaine, Mo. At least 15,000 tons of pending inquiry is active, 11,000 tons being for the Daily News Building and 4000 tons for the Engineers Building, both in Chicago. Outstanding among fresh inquiries is 7000 tons for a grandstand at Arlington, Ill. New projects of note are a \$15,000,000 municipal auditorium for Chicago and a tower calling for 4000 tons to be erected in Grant Park, Chicago. Shops in the Chicago district are going into the summer months with small order books as compared with a year ago. Average operations among the small fabricators are not above 50 per cent of capacity, while some of the larger shops are running at 80 per cent, a 10 per cent drop in the past three weeks. Competition for going tonnage is keen, and fabricators are pressing mills for lower prices on plain material. Local producers are meeting Eastern competition to the east and south by quoting 1.90c., Chicago, while in this city and to the west and north 2c. is the ruling price.

Mill prices on plain material per lb.: 2c., Chicago.

Bars.—Following the comparatively dull first week in June, sales and specifications for soft steel bars have increased so that they now are only slightly smaller than current shipments. A fair amount of inquiry for third quarter is before the trade, and some forward business has been placed. Several weeks of favorable weather have made farm implement manufacturers more cheerful, though their orders for steel have not expanded. Reports from tractor plants, however, indicate that several of the larger manufacturers are operating at close to full capacity. Mill prices on soft steel bars are less firm, and buyers to the east and south are having little or no difficulty in obtaining 1.90c., Chicago district mills. Alloy steel bar mill engagement is well above 90 per cent, and specifications appear to assure a continuance of this rate until the end of the month. Both new buying and specifications for iron bars are light, and there has been no test of the current price of 2c., Chicago, which is meeting strong resistance from buyers. The demand for reinforcing bars and tubing made from rail steel still warrants double turn operation of both Chicago Heights mills. Several barn equipment manufacturers have entered third quarter contracts, but on the whole forward buying is dull. There is considerable inquiry for posts for snow fences. Mill quotations in Chicago are steady at 1.90c.

Mill prices per lb.: Soft steel bars, 2c., Chicago; common bar iron, 2c., Chicago; rail steel bars, 1.90c. Chicago.

Reinforcing Bars.—Awards of 100 tons each and larger are numerous, and shop operations have been speeded up to about 80 per cent of capacity. Contractors are insisting on prompt delivery, and with shipments approximately equal to new business, backlogs remain light. Although the demand for reinforcing bars has advanced with the season, dealers find that orders taken in the first five months of this year did not equal the total for the corresponding period of 1926. Old inquiry is of large proportions, but new requests for prices are scarce and there is

an increasing tendency to take tonnages at lower prices. Hard steel reinforcing bars have gone as low as 2c., Chicago, and 2.15c., Chicago warehouse, has been named in at least one large contract for the billet product. Recent awards and fresh inquiries are shown on page 1789.

Wire Products.—Third quarter contracting is getting under way, but at a slower pace than a year ago. Specifications from the manufacturing trade are showing only a slight tendency to drop off, and orders from jobbers, while spotty, are holding up better than they did in the first two weeks of June, 1926. Wet weather earlier in the spring delayed the erection of fences, so that the demand for woven wire products is continuing longer than usual. The demand for nails from country districts is fair, but in cities it is of negligible proportions. Rain in the dry areas of the Southeast and Southwest and less moisture in the Missouri River Valley have resulted in larger orders from those sections. Reports from various parts of the country indicate that crops on the whole are not up to the usual average condition for this time of the year. Prices are unchanged and are shown on page 1773.

Bolts, Nuts and Rivets.—Specifications are in smaller volume, partly as a result of heavy orders placed prior to the recent price advance and in some measure because of the slackening pace of industry as a whole. Buyers are now receiving third quarter contracts based on present quotations.

Rails and Track Supplies.—An Eastern railroad with a terminal at Chicago has added 3000 tons of standard-section rails to the contract it placed last fall. Secondary buying of rails has not come up to expectations and, with specifications running lighter, mills have cut rolling schedules to about 78 per cent of capacity. Miscellaneous orders for track accessories total 1000 tons, and fresh inquiry calls for about 2000 tons. The peak in demand for tie plates was reached early in the week, and production has been cut 10 per cent, or to 90 per cent. Shipments of all track supplies are averaging 75 per cent of local mill capacity. Demand for light rails is dull.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bessemer rails, \$43; light rails, rolled from billets, \$36 to \$38. Per Lb.: Standard railroad spikes, 2.90c.; track bolts with square nuts, 3.90c.; steel tie plates, 2.35c.; angle bars, 2.75c.

Sheets.—Orders for third quarter are unusually slow, and current specifications do not fill rolling schedules a week in advance. Delivery is prompt on all finishes, and users find it unnecessary to increase their light stocks or to anticipate their wants more than two or three weeks in advance. Warehouses are taking larger tonnages, but the demand from the general manufacturing trade shows a tendency to taper.

Prices per lb., delivered from mill in Chicago: No. 24 black, 3.15c.; No. 24 galvanized, 4c.; No. 10 blue annealed, 2.40c. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

Cold-Rolled Strip.—Production is slowing down, resting momentarily at 75 per cent of capacity. Third quarter contracting is under way at current quotations.

Cast Iron Pipe.—Saint Claire Spores, Mich., which was to have taken figures June 7 on 4525 tons of 12-in. Class C pipe and 1150 tons of 8-in. Class B pipe has

postponed opening bids until June 21. Several sizable orders have been placed by private buyers, and the aggregate of tonnage purchased by small municipalities has made this week compare favorably with the average in May. Foundry schedules are well maintained and are so arranged that buyers are having little or no difficulty in getting pipe when required. New orders this week totaled only a trifle below shipments, and deliveries remain at about 30 days for all sizes. Prices are steady but do not indicate the strength that is sometimes apparent prior to a summer delivery buying movement. Glencoe, Ill., will buy 200 tons of 16-in. Class C pipe for a municipal filtration plant that is now under construction.

Prices per net ton, delivered Chicago: Water pipe, 6-in. and over, \$43.20 to \$43.70; 4-in., \$47.20 to \$47.70; Class A and gas pipe, \$4 extra.

Coke.—Shipments in June are not holding up to the average for late May. Spot sales are relatively few at 50c. above the contract prices of \$9.75, ovens, and \$10.25, delivered in the Chicago switching district.

Old Material.—The market is still leaning toward the weak side both as to demand and as to prices. Heavy melting steel is being offered at \$12.50 per gross ton, delivered, but buyers, possibly in an effort to reduce inventories by July 1, are not interested in making commitments at this time. Low prices are keeping much country scrap out of the market, but railroad shipments continue in good volume. Notwithstanding low prices obtained, industrial producers are not allowing scrap to accumulate. Several users, finding orders for their products in smaller volume, have cancelled contracts for scrap that were placed at higher levels. Taken as a whole, the indications are that users, while not having large stocks, are well supplied for three to four weeks, or at least long enough to carry them over the mid-year inventory period. The trade expects a dull market and weak prices until after the turn of the month. Lists this week include 6500 tons offered by the Rock Island, 2400 tons advertised by the Great Northern and 2000 tons by the Northern Pacific.

Prices delivered consumers' yards, Chicago:

Per Gross Ton	
Basic Open-Hearth Grades	
Heavy melting steel.....	\$12.00 to \$12.50
Shoveling steel	12.00 to 12.50
Frogs, switches and guards, cut apart, and miscellaneous rails.....	13.00 to 13.50
Hydraulic compressed sheets.....	10.00 to 10.50
Drop forge flashings.....	9.25 to 9.75
Acid Open-Hearth Grades	
Forged, cast and rolled steel car-wheels	14.25 to 14.75
Railroad tires, charging box size.....	14.50 to 15.00
Railroad leaf springs, cut apart.....	14.50 to 15.00
Steel couplers and knuckles.....	14.25 to 14.75
Coil springs	14.75 to 15.25
Low phosphorus punchings.....	14.50 to 15.00
Electric Furnace Grades	
Axle turnings	11.50 to 12.00
Blast Furnace Grades	
Axle turnings	9.75 to 10.25
Cast iron borings.....	9.50 to 10.00
Short shoveling turnings.....	9.50 to 10.00
Machine shop turnings.....	6.75 to 7.25
Rolling Mill Grades	
Iron rails	13.50 to 14.00
Rerolling rails	14.75 to 15.25
Cupola Grades	
Steel rails, less than 3 ft.....	15.00 to 15.50
Angle bars, steel.....	13.00 to 13.50
Cast iron carwheels.....	13.50 to 14.00
Malleable Grades	
Railroad	13.50 to 14.00
Agricultural	13.50 to 14.00
Miscellaneous	
*Relaying rails, 56 to 60 lb.....	25.50 to 26.50
*Relaying rails, 65 lb. and heavier	26.00 to 31.00
Per Net Ton	
Rolling Mill Grades	
Iron angle and splice bars.....	13.50 to 14.00
Iron arch bars and transoms.....	18.50 to 19.00
Iron car axles.....	20.00 to 20.50
Steel car axles.....	17.00 to 17.50
No. 1 railroad wrought.....	11.00 to 11.50
No. 2 railroad wrought.....	10.50 to 11.00
No. 1 busheling.....	9.25 to 9.75
No. 2 busheling.....	6.00 to 6.50
Locomotive tires, smooth.....	13.75 to 14.25
Pipes and flues.....	7.00 to 7.50
Cupola Grades	
No. 1 machinery cast.....	14.50 to 15.00
No. 1 railroad cast.....	13.50 to 14.00
No. 1 agricultural cast.....	13.25 to 13.75
Stove plate	12.50 to 13.00
Grate bars	11.50 to 12.00
Brake shoes	10.00 to 10.50

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes.....	3.10c.
Soft steel bars.....	3.00c.
Reinforcing bars, billet steel.....	2.20c. to 2.65c.
Cold-finished steel bars and shafting—	
Rounds and hexagons.....	3.60c.
Flats and squares.....	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24).....	3.95c.
Galvanized sheets (No. 24).....	4.80c.
Blue annealed sheets (No. 10).....	3.50c.
Spikes, standard railroad.....	3.55c.
Track bolts	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.
Per Cent Off List	
Machine bolts	60
Carriage bolts	60
Coach or lag screws.....	60
Hot-pressed nuts, squares, tapped or blank.....	60
Hot-pressed nuts, hexagons, tapped or blank.....	60
No. 8 black annealed wire, per 100 lb.....	\$3.20
Common wire nails, base per keg.....	\$2.85 to 2.95
Cement coated nails, base per keg.....	2.95

New York

Pig Iron Sluggish—Heavy Specifying on Sheet Contracts

NEW YORK, June 14.—Sales of pig iron by local brokers during the past week totaled barely 5000 tons. Pending inquiries are slow in closing, and while some of the smaller foundries are showing more interest in the market, melters on the whole are apathetic. While there have been some signs of improvement in foundry operations, reduced melt is reported from other directions. Judging by specifications against pig iron now on order and making due allowance for suspensions of shipments, the average rate of melt shows little change. The market is still highly competitive, and prices are no stronger, with eastern Pennsylvania foundry iron available at \$20.50, base furnace, and Buffalo foundry at \$17.50, base furnace.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25 (all rail).....	\$22.41
No. 2 plain fdy. (by barge, del'd alongside in lighterage limits N. Y. and Brooklyn).....	\$19.75 to 20.50
East. Pa. No. 2 fdy., sil. 1.75 to 2.25.....	21.89 to 23.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75.....	22.39 to 23.52
East. Pa. No. 1X fdy., sil. 2.75 to 3.25.....	22.89 to 24.02
No. 2 Virginia fdy., sil. 1.75 to 2.25.....	27.04

Freight rates: \$4.91 from Buffalo, \$1.39 to \$2.52 from eastern Pennsylvania, \$5.51 from Virginia.

Ferroalloys.—An inquiry for 1500 to 2000 tons of ferromanganese for delivery in the last half is before the market. One or two other consumers are reported as still negotiating for that position. Inquiries continue for carload and smaller lots for early delivery and specifications on contracts are said to be improving. Some foreign spiegeleisen is reported unsold, but on the whole the market is quiet with new business confined to small lots and specifications on contracts satisfactory. Consumers are quite active in their demands for ferrosilicon and ferrochromium as provided for by contracts.

Finished Steel.—The insistence of some of the sheet manufacturers that customers specify against second quarter low-priced contracts by June 15 has resulted in the placing of a fairly large tonnage within the past week. Manufacturers of cold-rolled strip steel have taken similar action and there has been a good response from buyers. Some third quarter contracts for sheets have been entered by nearly all mills at the new prices, but it is probable that the material now being specified will carry many users well into the next quarter. The determination of sheet mills to maintain the new level of prices is in sharp contrast, however, to the weakness which affects some other products, particularly plates, shapes and bars. Plate mills are now quite generally quoting 1.80c., Pittsburgh, on ordinary lots, with some concessions of \$1 a ton on more desirable tonnages. Quotations on structural shapes still range from 1.75c. to 1.85c., Pittsburgh, while on steel bars the range is 1.80c. to 1.85c., Pittsburgh. Wire products in the New York and New England territories are not active and price weakness is not encouraging consumers to commit themselves. There has been a slight improvement in the demand for butt-weld pipe in New York since the first of the month. Structural steel lettings in the metropolitan district in May, exclusive of bridges, subways, etc., amounted to 33,550 tons, as compiled by the Structural Steel Board of Trade of New York. This compares with 54,000 tons in April, this year, and with 29,500 tons in May, 1926. Inquiries now pending in the metropolitan district total upward of 16,000 tons.

Mill prices per lb. delivered New York: Soft steel bars, 2.14c. to 2.24c.; plates, 2.09c. to 2.19c.; structural shapes, 2.04c. to 2.19c.; bar iron, 2.14c.

Reinforcing Bars.—A reduction of \$2 a ton in the Youngstown warehouse price on bars has been adopted by most of the distributors in this territory, the new price being 2.40c. per lb. The reduction follows a drop of \$2 a ton in the mill price several weeks ago, but the price of 3.15c. delivered at job in New York metro-

politan district is still being quoted. A few additional inquiries have come into the market in the last week, but lettings have been scarce and mostly of small tonnage. Competition from foreign steel is growing keener, but domestic distributors are unwilling to meet the low prices obtainable on imported bars. Prices follow:

Prices per lb. on billet steel reinforcing bars: From mill, 1.90c., Pittsburgh. Out of New York warehouse, 3.15c., delivered at job. Out of Youngstown warehouse, 2.40c., Youngstown, or 2.77½c., delivered New York.

Warehouse Business.—Both the number and the size of orders from stock have shown a marked decline since the first of the month, so that at the present rate total sales for June will be considerably under those for May. There are still occasional purchases of structural

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes.....	3.34c.
Soft steel bars and small shapes.....	3.24c.
Iron bars.....	3.24c.
Iron bars, Swedish charcoal.....	7.00c. to 7.25c.
Cold-finished steel shafting and screw stock—	
Rounds and hexagons.....	4.00c.
Flats and squares.....	4.50c.
Cold-rolled strip, soft and quarter hard..	5.75c.
Hoops.....	4.49c.
Bands.....	3.99c.
Blue annealed sheets (No. 10 gage).....	3.89c.
Long terme sheets (No. 24 gage).....	5.80c.
Standard tool steel.....	12.00c.
Wire, black annealed.....	4.50c.
Wire, galvanized annealed.....	5.15c.
Tire steel, 1½ x ½ in. and larger.....	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger.....	3.65c.
Open-hearth spring steel, bases.....	4.50c. to 7.00c.
Machine bolts, cut thread: Per Cent Off List	
¾ x 6 in. and smaller.....	50 to 50 and 10
1 x 30 in. and smaller.....	45 to 50
Carriage bolts, cut thread:	
½ x 6 in. and smaller.....	50 and 10 to 60
¾ x 20 in. and smaller.....	50 to 50 and 5
Coach screws:	
½ x 6 in. and smaller.....	50 and 10 to 60
1 x 16 in. and smaller.....	50 to 50 and 5
Boiler Tubes— Per 100 Ft.	
Lap welded steel, 2-in.....	\$17.33
Seamless steel, 2-in.....	20.24
Charcoal iron, 2-in.....	25.00
Charcoal iron, 4-in.....	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt.....	46	29
¾-in. butt.....	51	37
1-in. butt.....	53	39
2½-6-in. lap.....	48	35
7 and 8-in. lap.....	44	17
11 and 12-in. lap.....	37	12
Wrought Iron—		
½-in. butt.....	4	+19
¾-in. butt.....	11	+9
1-1½-in. butt.....	14	+6
2-in. lap.....	5	+14
3-6-in. lap.....	11	+6
7-12-in. lap.....	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box.....	\$6.45	\$6.20
Charcoal, per box—	A	AAA
IC.....	\$9.70	\$12.10
IX.....	12.00	14.25
IXX.....	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating.....	\$10.00 to \$11.00
IC—30-lb. coating.....	12.00 to 13.00
IC—40-lb. coating.....	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20.....	4.00c.
No. 22.....	4.15c.
No. 24.....	4.20c.
No. 26.....	4.30c.
No. 28*.....	4.45c.
No. 30.....	4.70c.

Sheets, Galvanized

	Per Lb.
No. 14.....	4.35c. to 4.60c.
No. 16.....	4.45c. to 4.70c.
No. 18.....	4.60c.
No. 20.....	4.75c.
No. 22.....	4.80c.
No. 24.....	4.95c.
No. 26.....	5.20c.
No. 28*.....	5.45c.
No. 30.....	5.85c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

material, ranging up to 4 and 5 tons, and the demand for reinforcing bars is reported good. Prices are firm on all products, only occasional concessions appearing. Both black and galvanized sheets are quiet.

Cast Iron Pipe.—Prices of pressure pipe in this district cover a rather wide range, depending upon the condition of the seller's books and the tonnage involved. While small lots bring up to \$48.60 per ton, delivered, any inquiry for a substantial tonnage usually brings out quotations several dollars a ton less. As low as \$45.60 per ton is still obtainable on desirable business. Among recent purchases was about 2000 tons of pressure pipe by the American Construction & Securities Co., New York. Bridgewater, Mass., recently closed on about 100 tons of French pipe with B. Nicoll & Co., New York. Several fair-sized tonnages are still to be placed in this district, including the pipe for Rochester, N. Y., inquired for by the J. G. White Engineering Co., New York, and several hundred tons to be purchased by the Mason & Hanger Co., New York, for the Fulton Street tunnel.

Prices per net ton, delivered New York: Water pipe 6-in. and larger, \$45.60 to \$47.60; 4-in. and 5-in., \$50.60 to \$52.60; 3-in., \$60.60 to \$62.60; Class A and gas pipe, \$5 extra.

Coke.—Most of the contracting for third quarter and second half seems to have been completed, and the market on foundry and furnace grades for spot shipment is quiet. One large foundry coke producer, which has been quoting on contracts \$5.35 per ton, Connellsville, for open-top cars and \$5.60 for shipment in box cars, after June 23 will quote separately on each inquiry. The market on prompt shipment foundry continues at \$4.25 to \$4.75, and on furnace grade at \$3 to \$3.25 per ton, Connellsville. Delivered prices of Connellsville foundry coke are: To northern New Jersey, \$8.28 to \$8.78; New York or Brooklyn, \$9.04 to \$9.54; Newark or Jersey City, N. J., \$8.16 to \$8.66 per net ton. By-product foundry coke continues at \$9.59 to \$10.77 per net ton, delivered Newark or Jersey City, N. J.

Old Material.—Buying prices are still declining on most grades of scrap. While No. 1 heavy melting steel continues at \$13.50 to \$14 per ton, delivered eastern Pennsylvania, yard grade is quoted by dealers at \$11 to \$11.25 per ton, delivered, on shipments going to consumers at Pottsville and Phoenixville, Pa. The Phoenixville user of yard steel is now specifying that material must be less than 6 x 12 in. and more than 1/4 in. thick, free from excessive rust or dirt, and may include galvanized pipe. On this basis the consumer has offered to purchase at \$11 per ton, delivered, which would justify a buying price by the broker filling the order of \$10.50, or \$7 per ton, New York. A Harrisburg consumer of yard steel is also offering \$11 per ton, delivered, and the freight rate from New York is higher. A Bridgeport, Conn., user of foundry grade stove plate is unwilling to purchase at more than \$11.75 per ton, delivered, although until recently this plant was paying \$12.25 per ton. A broker filling a contract for blast furnace scrap at Bethlehem, Pa., has reduced the buying price from \$10.50 to \$10.25 per ton, delivered. It is reported that machine shop turnings have been purchased in carload lots at as low as \$5.85 per ton, New York, for shipment to Phoenixville, Pa.

Dealers' buying prices per gross ton, New York:

No. 1 heavy melting steel.....	\$10.00 to \$11.35
Heavy melting steel (yard).....	7.50 to 7.75
No. 1 heavy breakable cast.....	11.25 to 12.50
Stove plate (steel works).....	7.50 to 8.50
Locomotive grate bars.....	8.50 to 9.00
Machine shop turnings.....	6.00 to 7.50
Cast borings (blast furnace or steel works).....	7.00 to 7.50
Mixed borings and turnings.....	7.00 to 7.50
Steel car axles.....	15.75 to 16.25
Iron car axles.....	23.00 to 23.50
Iron and steel pipe (1 in. diam., not under 2 ft. long).....	8.75
Forge fire.....	7.25 to 7.75
No. 1 railroad wrought.....	11.50 to 12.00
No. 1 yard wrought, long.....	10.50 to 11.00
Rails for rolling.....	11.00 to 11.50
Cast iron carwheels.....	11.00 to 11.50
Stove plate (foundry).....	8.75 to 9.75
Malleable cast (railroad).....	11.00 to 11.50
Cast borings (chemical).....	12.25 to 13.25

Prices per gross ton, delivered local foundries:

No. 1 machinery cast.....	\$14.00 to \$14.50
No. 1 heavy cast (columns, building materials, etc.), cupola size	12.50 to 13.00
No. 2 cast (radiators, cast boilers, etc.).....	11.50 to 12.00

Philadelphia

Weakness Continues in Plates, Shapes and Bars—Pig Iron Dull

PHILADELPHIA, June 14.—According to estimates made by some local sales offices, steel sales so far this month show a falling off of about 10 per cent as compared with the daily average last month. Possible exceptions are sheets and cold-rolled strip steel, in which specifications have been fairly large due to the action of some mills in making June 15 the time limit on specifying against low-priced second quarter contracts. All branches of the market—steel, pig iron and scrap—show marked signs of lessened interest among consumers. It is on plates, shapes and bars that price weakness is most apparent. Bars are now selling in many instances down to 1.80c., Pittsburgh, with 1.85c. virtually the top of the market, while on plates 1.80c., Pittsburgh, is also the usual price, though some small lots command 1.85c. The market on structural shapes might be named as 1.75c. to 1.80c., Pittsburgh, for ordinary lots, with sales below 1.75c. when the more attractive tonnages are considered.

Pig Iron.—Except for a sale of 5000 tons by the New England furnace to a Delaware River cast iron pipe maker, the pig iron market has been barren of important transactions. Sales have been confined to lots ranging from a carload to a few hundred tons, mostly for shipment in the third quarter. Foundry iron is being sold at a base price of \$21, furnace, with the probability that lower prices would not move much iron, considering that many consumers are well taken care of for the next month or two, and in some instances for all of third quarter. The principal users of basic pig iron in this district are melting less iron than a month ago, and it is not likely that there will be any fresh basic inquiry before the end of the month. In the present dull situation foundry iron plays only a small part, but one or two preferred brands of imported iron bring a slight premium over domestic iron.

Prices per gross ton at Philadelphia:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	\$21.76 to \$22.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	22.26 to 22.76
East. Pa. No. 1X.....	22.76 to 23.26
Basic (delivered eastern Pa.)....	20.75 to 21.25
Gray forge.....	21.00 to 21.50
Malleable.....	22.50 to 23.00
Standard low phos. (f.o.b. New York State furnace).....	25.00
Copper bearing low phos. (f.o.b. furnace).....	25.00 to 26.00
Virginia No. 2 plain, 1.75 to 2.25 sil.	26.67
Virginia No. 2X, 2.25 to 2.75 sil.	27.17

Prices, except on low phosphorus, are delivered Philadelphia. Freight rates: 76c. to \$1.64 from eastern Pennsylvania furnaces; \$5.17 from Virginia furnaces.

Ferromanganese.—A few contracts for second half have been made by domestic producers at \$90, seaboard. Very little foreign alloy is being sold.

Plates.—Eastern plate mills are down to a low rate of operation, in one or two instances below 50 per cent, with the average probably not above that figure. Competition has become keener, with the result that prices have settled to a range of 1.80c. to 1.85c., Pittsburgh, the lower figure applying on the more desirable lots. The Lukens Steel Co. has prepared a new list of extras for flanging and dishing, representing slight advances on some sizes.

Structural Shapes.—With business in slightly reduced volume this month, prices of structural shapes continue to show weakness, the regular market level on ordinary lots now being down to a range of 1.75c. to 1.80c., Pittsburgh, with some transactions of the more attractive sort at \$1 or \$2 a ton below the lower figure. While this erratic price situation has existed for months, it is somewhat more pronounced now because of the dearth of large jobs; hence there is more competition for the smaller ones. A new situation has arisen in the letting of a contract for a steel building requiring about 1000 tons, to be fabricated by the American Bridge Co. for the General Electric Co., Philadelphia, all joints to be welded instead of riveted. The Philadelphia building code does not admit of anything but riveted steel construction, but it is stated that

steps probably will be taken to overcome this difficulty. The largest award of the week was 2000 tons for a bank and office building at Fifteenth and Walnut Streets.

Bars.—Steel bars are now being more openly quoted at 1.80c., Pittsburgh, with 1.85c. applying on the smaller orders. Buying is in declining volume and mills are more eagerly seeking tonnage. Bar iron remains at 2.12c., Philadelphia.

Sheets.—Some of the sheet mills have been urging customers to specify in full against their second quarter contracts before June 15, several taking the stand that all unspecified tonnage would be cancelled on that date. This has resulted in the placing of a fairly large volume of business, which, however, will carry users well into third quarter. New business is in light volume, but some third quarter contracts have been entered at the new prices, which are 2.25c. for blue annealed, 3c. for black and 3.85c. for galvanized, Pittsburgh base.

Imports.—Large pig iron imports came in at this port last week, considerable of it being low phosphorus iron from England. The English shipments totaled 4200 tons, while 2497 tons came from India and 250 tons from the Netherlands. Other imports were as follows: Structural shapes from Belgium, 139 tons; manganese ore from British India, 1500 tons; manganese ore from Java, 500 tons; iron ore from Algeria, 6830 tons; crude iron ore waste from Germany, 541 tons; chrome ore from British India, 1000 tons; ferromanganese from England, 125 tons.

Old Material.—A steel company bought a tonnage of bundled sheets and machine shop turnings for open-hearth use last week at \$10, delivered, and smaller lots of stove plate and railroad grate bars at \$12, delivered. These were the principal transactions, the scrap market remaining dull and prices almost stationary. Heavy breakable cast scrap is slightly weaker at \$15 to \$15.50, delivered. Heavy melting steel is freely obtainable at \$14.50.

Prices per gross ton, delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel.....	\$14.00 to \$14.50
Scrap T rails	13.50 to 14.00
No. 2 heavy melting steel.....	12.00 to 13.00
No. 1 railroad wrought.....	16.00 to 16.50
Bundled sheets (for steel works)	10.00
Machine shop turnings (for steel works)	10.00
Heavy axle turnings (or equivalent)	12.50 to 13.00
Cast borings (for steel works and rolling mill)	11.50
Heavy breakable cast (for steel works)	15.00 to 15.50
Railroad grate bars.....	12.00
Stove plate (for steel works)...	12.00
No. 1 low phos., heavy, 0.04 per cent and under	18.00 to 18.50
Couplers and knuckles.....	16.00 to 16.50
Roller steel wheels	16.00 to 16.50
No. 1 blast furnace scrap.....	10.00 to 10.50
Machine shop turnings (for rolling mill)	10.50 to 11.00
Wrought iron and soft steel pipes and tubes (new specifications) ..	12.50 to 13.00
Shafting	18.00 to 18.50
Steel axles	19.00 to 20.00
No. 1 forge fire	11.00 to 11.50
Steel rails for rolling.....	16.00 to 16.50
Cast iron carwheels.....	15.50 to 16.00
No. 1 cast	16.00 to 17.00
Cast borings (for chemical plant)	15.00 to 16.00

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier.....	2.80c. to 3.00c.
Plates, ⅜-in.	3.00c. to 3.20c.
Structural shapes	2.65c. to 3.00c.
Soft steel bars, small shapes and iron bars (except bands).....	2.70c. to 3.20c.
Round-edge iron	3.50c.
Round-edge steel, iron finished, 1½ x 1½ in.	3.50c.
Round-edge steel, planished.....	4.30c.
Reinforcing steel bars, square, twisted and deformed.....	3.00c.
Cold-finished steel, rounds and hexagons	4.00c.
Cold-finished steel, squares and flats	4.50c.
Steel hoops	3.85c. to 4.15c.
Steel bands, No. 12 gage to ⅝-in., inclusive	3.60c. to 3.90c.
Spring steel	5.00c.
Black sheets (No. 24).....	4.35c.
Galvanized sheets (No. 24).....	5.20c.
Blue annealed sheets (No. 10)...	3.30c.
Diamond pattern floor plates—	
¼-in.	5.30c.
⅜-in.	5.50c.
Rails	3.20c.
Swedish iron bars.....	6.60c.

Cleveland

Operations of Automotive Industry Taper—Pig Iron Lower

CLEVELAND, June 14.—The demand for steel bars, plates and structural material is about holding up to the recent light volume. While a few inquiries for steel bars for the third quarter have come out, consumers as a rule are showing no interest in contracts. Several of the outside mills are holding to 1.85c., Pittsburgh, on steel bars and most of the business is going at that price. However, a price of 1.80c. has appeared on desirable lots. Some of the mills will take on third quarter tonnage at 1.85c. The local mill price ranges from 1.80c. to 1.90c., Cleveland. On plates and structural material 1.80c., Pittsburgh, is being quite generally quoted except for small lots, which are bringing 1.85c.

As compared with the weaker prices in the heavier rolled products brought about by the highly competitive situation, the new higher prices on sheets and strip steel are being well maintained and the automotive industry has placed several good-sized lots at those levels for the third quarter. While production in this industry has slowed down, mills are still getting considerable tonnage from this source for early shipment. Inquiry in the building field is holding up well, but keen competition among fabricators is bringing out some low prices. The Biggs Boiler Works, Akron, Ohio, was low bidder for a municipal pipe line in Detroit, requiring 1600 tons of plates.

Pig Iron.—Sales increased in the past week, but the keenly competitive conditions have resulted in some weakening in prices. Cleveland producers have made a flat reduction of 50c. a ton to \$18.50, furnace, for foundry and malleable iron for local delivery and sold considerable tonnage during the week to Cleveland foundries. For some time there had been virtually no local buying. For delivery in the immediate Cleveland territory local producers are no longer trying to get above \$18 at furnace, and this price has been shaded. For shipment to more competitive points \$18 is the usual Lake furnace price, but one or two producers are going 25c. to 50c. a ton lower. In Michigan the market is unchanged at \$19, furnace. While \$18.50, furnace, is still the common quotation in the Valley district, some business is reported to have been taken at \$18. Cleveland interests sold 30,000 tons during the week, as compared with 20,000 tons the previous week. However, the volume of inquiry pending is not sufficient to indicate the beginning of a very active buying movement. A new competitor for foundry iron, a Columbus furnace, is reported to have entered the Ohio field. This furnace for the past few years has limited its sales to malleable iron.

Prices per gross ton at Cleveland:

N'th'n No. 2 fdy., sil. 1.75 to 2.25.	\$19.00
Southern fdy., sil. 1.75 to 2.25...	24.00
Malleable	19.00
Ohio silvery, 8 per cent.....	31.50
Basic, Valley furnace.....	18.00
Standard low phos., Valley fur.	\$27.50 to 28.00

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; \$3 from Jackson, Ohio; \$6 from Birmingham.

Coke.—Heating coke for foundry purposes is softer, with quotations at \$2.75 to \$2.90, ovens, for prompt shipment. There is not much activity in foundry coke. Prices are unchanged at from \$4, ovens, for standard Connellsville brands up to \$5.35 for the best grades.

Iron Ore.—A new inquiry for 30,000 tons of ore has come from a Pittsburgh district consumer, but with this exception the market is lifeless. A number of Lake boats have been tied up because the capacity of the fleet in commission is in excess of requirements for the ore and coal trade. On June 1 there was 4,756,173 tons of ore on Lake Erie docks, as compared with 4,323,944 tons on the same date a year ago. Receipts at Lake Erie ports for May were 4,969,219 tons, and for the season until June 1, 5,701,987 tons, as compared with 3,337,888 tons during the corresponding period a year ago. Shipments from these docks

during May were 3,955,155 tons, and for the season until June 1, 5,105,722 tons, as against 3,864,156 tons up to June 1 last year.

Fluorspar.—Leading producers are still holding to \$18, mines, for gravel fluorspar, and one round lot, as well as a few car lots, was taken at that price during the week. However, some of the smaller domestic producers are going to \$17.50.

Semi-Finished Steel.—Consumers are ordering in small lots against existing contracts, and production is being maintained at the recent rate. Manufacturers have not yet named third quarter prices, and no inquiry has yet come out for that delivery.

Sheets.—The market is decidedly firmer in that some of the Ohio mills that have been quoting on a mill basis have gone back to a Pittsburgh base, which is now quite generally reestablished in this district. Some additional third quarter business has been closed by leading Detroit automobile companies, and it is claimed that all this went at regular prices. Some of the larger car manufacturers are understood to have bought 15 per cent less tonnage than they did for the third quarter last year. A limited amount of shading to 2.85c. and 2.90c. on black sheets is still reported, but this is only on prompt shipment business.

Strip Steel.—Contracts for good-sized lots of both hot and cold-rolled strip steel for the third quarter have been placed by Michican automobile companies at the new prices. Orders against old low-price contracts are good, and little second quarter tonnage will be unspecified. Mills are operating well but do not have much tonnage on their books.

Reinforcing Bars.—Reflecting the lower range of prices on billet steel bars, lower prices are appearing on rail steel bars. These are now quoted at 1.65c. to 1.75c., mill, but are bringing little business in competition with the local price of 1.80c. that is being made on new billet steel bars. Prices out of stock are very irregular, due to mill competition for small lots, and as low as 2.25c. is being quoted.

Warehouse Business.—Local warehouses have adopted, effective June 15, a quantity differential on cold-finished steel bars for lots of less than 500 lb. and in one size. The new extras are \$1 per 100 lb. for less than 100 lb., 75c. for 100 to 299 lb., and 50c. for 300 to 499 lb. Warehouse business continues slow. Prices are firm.

Bolts, Nuts and Rivets.—Third quarter prices for bolts and nuts will remain at the present discount of 70 per cent off list. Manufacturers opened their books this week for the coming quarter at the prices now in effect. The leading local rivet manufacturer has come out with the present price of \$2.75 per 100 lb., Cleveland and Pittsburgh, for contracts for the third quarter, but has advanced its prices to \$3 for small-lot buyers. It is also naming its present discount of 70 and 10 per cent off list on small rivets to large buyers for the next quarter, but to small-lot buyers it is quoting 70 off.

Old Material.—A Cleveland mill during the week purchased several thousand tons of selected heavy melting steel scrap of a grade equivalent to railroad steel, and dealers are paying \$14.50 for this grade to fill their new orders. This purchase has resulted in a slightly firmer tone on No. 1 heavy melting steel, but prices on other grades are unchanged. While scrap is plentiful, present prices are not bringing out a very large supply. One reason for this is that much of the Detroit scrap has gone to Buffalo this season, and

dealers who are offering \$11.25 for blast furnace scrap for Youngstown and Canton delivery, or equivalent to \$8.25, Detroit, contend that they are unable to buy Detroit scrap at that price.

Prices per gross ton, delivered consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel.....	\$13.50 to \$14.00
No. 2 heavy melting steel.....	13.00 to 13.25
Compressed sheet steel.....	13.00 to 13.25
Light bundled sheet stampings...	11.50 to 12.00
Drop forge flashings.....	12.50 to 13.00
Machine shop turnings.....	8.75 to 9.00
No. 1 railroad wrought.....	11.50 to 12.00
No. 2 railroad wrought.....	13.75 to 14.00
No. 1 busheling.....	11.50 to 11.75
Pipes and flues.....	10.00 to 10.50
Steel axle turnings.....	12.50 to 13.00
Acid Open-Hearth Grades	
Low phosphorus forging crops...	16.50 to 17.00
Low phosphorus, billet bloom and slab crops.....	17.00 to 17.50
Low phosphorus sheet bar crops.....	16.00 to 16.50
Low phosphorus plate scrap.....	16.00 to 16.50
Blast Furnace Grades	
Cast iron borings.....	10.25 to 10.50
Mixed borings and short turnings.....	10.25 to 10.50
No. 2 busheling.....	10.25 to 10.50
Cupola Grades	
No. 1 cast.....	16.50 to 17.00
Railroad grate bars.....	12.00 to 12.50
Stove plate.....	12.00 to 12.50
Rails under 3 ft.....	18.00 to 18.50
Miscellaneous	
Railroad malleable.....	15.50 to 16.00
Rails for rolling.....	16.25 to 16.50

Portland Chapter of Welding Society

The Portland section of the American Welding Society, Portland, Ore., held its annual meeting June 3, electing the following officers: Ray L. Smythe, Willamette Iron & Steel Works, chairman; C. T. Price, Portland Oxygen & Hydrogen Co., first vice-chairman; William Creighton, Creighton Boiler & Welding Works, second vice-chairman; George C. Dierking, Steel Tank & Pipe Co., treasurer, and S. M. McKinnon, Linde Air Products Co., executive council. The Portland chapter was formed just one year ago and secured enough members at its initial meeting to entitle it to a charter.

Specifications for Tubes and Fittings

The Federal Specifications Board, Washington, has issued specifications covering seamless steel tubes for aircraft, No. 490, and threaded cast iron pipe fittings. The latest date on which the technical requirements of these specifications shall become mandatory for all Government establishments is Aug. 12. The specifications for tubes for aircraft cover carbon and nickel steel and chrome molybdenum. The specifications for cast iron pipe fittings cover two types, one of 125 lb. working pressure per sq. in. and the other of 250 lb.

Welds Steel Window Frames to Building Frame

The rapid entry of arc welding practice into the building trades is illustrated by the case of a novel application of the process made on the new Union Station at Cleveland. Steel window frames which have heretofore been wedged into position with timbers were, in this instance, welded to the overhead beam, using standardized steel straps prepared for the purpose. A. F. Davis, vice-president Lincoln Electric Co., Cleveland, says that a number of new uses of welding in building construction are under discussion as a result of the information gained.

The Baldwin Locomotive Works, which is concentrating its manufacturing operations at Eddystone, Pa., will continue to have its general offices in Philadelphia, having announced the signing of a lease for an entire floor in the Fidelity-Philadelphia Trust Building, now in course of construction at Broad and Walnut Streets.

The Carpenter Steel Co., Reading, Pa., has removed its Philadelphia office to the National Bank of North Philadelphia Building, North Broad Street, at Erie and Germantown Avenues.

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and structural shapes.....	3.00c.
Soft steel bars.....	3.00c.
Reinforcing steel bars.....	2.25c. to 3.00c.
Cold-finished rounds and hexagons.....	3.65c.
Cold-finished flats and squares.....	4.15c.
Hoops and bands.....	3.65c.
Cold-rolled strip.....	5.95c.
Black sheets (No. 24).....	3.75c.
Galvanized sheets (No. 24).....	4.50c.
Blue annealed sheets (No. 10).....	3.25c.
No. 9 annealed wire, per 100 lb.....	\$2.90
No. 9 galvanized wire, per 100 lb.....	3.35
Common wire nails, base, per keg.....	2.90

*Net base, including boxing and cutting to length.

San Francisco

Call for Bids on 2500 Tons of Bars —Prices Firm but Buying Tapers

SAN FRANCISCO, June 11 (*By Air Mail*).—Business during the week has been confined to routine developments with one or two exceptions. In reinforcing bars, although no individual letting of 100 tons or more has been reported, the amount of tonnage placed in small lots has been fairly substantial. At San Carlos, Ariz., bids will be taken July 19 on 2500 tons of concrete bars for the proposed Coolidge dam, a Government reclamation project. Buying in nearly all departments of the market has grown less active during the past month, but prices, with minor exceptions, are holding firm.

Pig Iron.—Little of importance has featured the week. Fresh shipments of foreign iron are expected in the near future. Quotations are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	.....\$25.00 to \$26.00
*Utah foundry, sil. 2.75 to 3.25	25.00 to 26.00
**Indian foundry, sil. 2.75 to 3.25	25.00
**German foundry, sil. 2.75 to 3.25	24.25

*Delivered San Francisco.

**Duty paid, f.o.b. cars San Francisco.

Shapes.—Lettings for the week totaled 1675 tons; fresh inquiry calls for about 200 tons. The largest individual award of the week, 800 tons for an office building in Portland, Ore., was taken by Poole & McGonigle, local fabricators. At Phoenix, Ariz., the Kansas City Structural Steel Co. is low bidder on 1000 tons for a bridge at Lee's Ferry, Ariz. Eastern mills continue to quote 2.35c., c.i.f. Coast ports.

Plates.—Spokane, Wash., has placed 728 tons for a municipal pipe line with two fabricators—537 tons with the Steel Tank & Pipe Co. and 191 tons with the Beale Tank & Pipe Co. The Steel Tank & Pipe Co. is low bidder on 500 tons for a pipe line for the Nevada Irrigation District at Grass Valley, Cal. Fresh inquiry is relatively unimportant. Eastern mills continue to quote 2.30c., c.i.f. Coast ports.

Bars.—In concrete bars no letting of 100 tons or over has been reported during the week, but the amount of business in small lots that has been booked by local jobbers is fairly large. Fresh inquiries are for small tonnages, with the exception of 2500 tons for the proposed Coolidge dam at San Carlos, Ariz., mentioned above. Local reinforcing bar jobbers quote as follows: 2.85c., base, per lb., on lots of 200 tons, and 3.10c., base, on less-than-carload lots.

Cast Iron Pipe.—Sebastapol, Cal., will hold a referendum June 20 on a bond issue of \$60,000, of which it is planned to use \$38,000 for a proposed addition to the present water system. Seattle, Wash., has awarded 431 tons of 4 to 12-in., Classes B and C pipe, and 368 tons of 6 and 12-in., Classes B and C pipe for street improvements to unnamed producers through general contractors. San Diego, Cal., will take bids June 27 on 881 tons for the Linda Vista Mesa water development project, and tenders will be received on the same date on 100 tons for street improvements.

Steel Pipe.—A report from Bakersfield, Cal., states that the Shell Oil Co. is preparing plans for the construction of a 10-in. pipe line from Coalinga to Taft, Cal., with an 8-in. lateral line to run into the Mount Pasco oil fields and also into the Rand Mountain area. The estimated cost is \$3,500,000.

Sheets.—The Kittle Mfg. Co., Los Angeles, has been awarded a contract for motor vehicle license plates by the State of Texas, which will require 450 tons of black sheets.

Warehouse Prices, f.o.b. San Francisco

Plates and structural shapes	..... 3.00c.
Soft steel bars	..... 3.00c.
Small angles, $\frac{3}{8}$ -in. and over	..... 3.00c.
Small angles, under $\frac{3}{8}$ -in.	..... 3.40c.
Small channels and tees, $\frac{3}{4}$ -in. to 2 $\frac{3}{4}$ -in.	..... 3.60c.
Spring steel, $\frac{1}{4}$ -in. and thicker	..... 5.00c.
Black sheets (No. 24)	..... 4.80c.
Blue annealed sheets (No. 10)	..... 3.75c.
Galvanized sheets (No. 24)	..... 5.35c.
Common wire nails, base per keg	..... \$3.75
Cement coated nails, 100-lb. keg	..... 3.75

Toronto

Melters Show Interest in Third Quarter Pig Iron Needs

TORONTO, ONT., June 14.—With the beginning of third quarter near at hand, Canadian melters are beginning to take more interest in the pig iron market. While there has been no rush by consumers to cover for third quarter needs, inquiries are increasing and a few of the larger consumers have already placed contracts. Spot demand for pig iron has dropped off somewhat during the past few days. This, however, is believed to be but a temporary slump, since foundries and various other pig iron consuming interests are operating at better than 70 per cent capacity. Pig iron production continues at a high level, and large tonnages are being imported from the United States, Great Britain and Continental countries. Prices are firm but unchanged.

Prices per gross ton:

Delivered Toronto	
No. 1 foundry, sil. 2.25 to 2.75	.....\$24.10
No. 2 foundry, sil. 1.75 to 2.25	..... 24.10
Malleable	..... 24.10
Delivered Montreal	
No. 1 foundry, sil. 2.25 to 2.75	..... 26.50
No. 2 foundry, sil. 1.75 to 2.25	..... 26.50
Malleable	..... 26.50
Basic	..... 25.50
Imported Iron at Montreal Warehouse	
Summerlee	..... 36.00
Carron	..... 36.00

Old Material.—Consumers are showing but passing interest in the market and are ordering supplies only for immediate needs. While a large number of users throughout Ontario and Quebec are fairly well covered for the present, dealers look for a more active buying movement before the close of this month. Some inquiry is appearing for third quarter, but little contracting has been done of late. Specifications against contracts, however, are appearing at frequent intervals and the general movement of old material between dealers and consumers is in good volume. Some large accumulations of scrap are now being thrown on the market, and these are being absorbed by dealers, who are buying mostly in a speculative way. Dealers' buying prices are unchanged.

Dealers' buying prices:

	Toronto	Montreal
Per Gross Ton		
Heavy melting steel	.....\$10.50	\$9.00
Rails, scrap	..... 11.00	10.00
No. 1 wrought	..... 11.00	14.00
Machine shop turnings	..... 8.00	7.50
Boiler plate	..... 8.00	8.00
Heavy axle turnings	..... 8.50	8.50
Cast borings	..... 8.50	7.50
Steel turnings	..... 8.00	8.00
Wrought pipe	..... 6.00	6.00
Steel axles	..... 15.00	17.00
Axles, wrought iron	..... 17.00	19.00
Per Net Ton		
No. 1 machinery cast	..... 16.00	18.00
Stove plate	..... 10.00	13.00
Standard carwheels	..... 14.00	16.00
Malleable scrap	..... 14.00	14.00

Birmingham

Progressive Recession in Business in Both Pig Iron and Steel—Pipe Declines

BIRMINGHAM, June 14.—The recession in business that has been reflected in the past two weeks by the blowing out of two blast furnaces and a reduction in the number of active open-hearth furnaces is expected to become even more pronounced. In the pig iron market day-to-day orders are still in good volume and shipments are going forward at a steady rate, but the outlook among consuming interests is unfavorable. Many melters still have considerable unfilled tonnage on their books, but with new business coming in slowly, their backlogs are gradually dwindling. Nine blast furnaces in Alabama are still producing foundry iron, while 10 are on basic and one is on special iron. The market remains unchanged at \$18, Birmingham, for No. 2 foundry grade. The recent report of a concession

from that price on a tonnage of basic iron lacks verification.

Prices per gross ton, f.o.b. Birmingham district furnaces:

No. 2 foundry, 1.75 to 2.25 sil...	\$18.00
No. 1 foundry, 2.25 to 2.75 sil...	18.50
Basic	18.00
Charcoal, warm blast.....	29.00

Rolled Steel.—With business in steel tapering, there has been a further slowing down of production. Advantage is being taken of the slow rate of operations to go ahead with plant improvements and betterments. The Gulf States Steel Co. has undertaken a program of development and improvement at all of its properties, while the Tennessee Coal, Iron & Railroad Co. will introduce changes in its mill equipment in July. Fabricating shops are still busy, but their requirements are not sufficient to balance the decline in demands from other directions. Mill prices on finished steel products are unchanged.

Cast Iron Pipe.—Pressure pipe shops are still operating at a good rate and are reducing stocks of pipe on their yards, but in view of a decline in municipal lettings their new business has suffered. Pressure pipe prices have declined, now ranging from \$34 to \$35, Birmingham, for 6-in. and larger diameters.

Coke.—Production throughout this district continues to taper, with independent ovens keeping output in pace with a diminishing demand. By-product foundry coke remains unchanged at \$5.50 per net ton, Birmingham, and the little beehive coke that is being produced is commanding \$6. Additions to coke-producing capacity are being pushed to completion in the belief that demand will be heavy in the late fall.

Old Material.—The market is quiet. Heavy melting steel and No. 1 cast are not moving in such good volume as a few weeks ago. Dealers are finding the supply of scrap more than ample to fill current orders.

Prices per gross ton, delivered Birmingham district consumers' yards:

Heavy melting steel	\$12.00 to \$12.25
Scrap steel rails	12.50 to 13.00
Short shoveling turnings.....	8.50 to 9.00
Cast iron borings.....	8.50 to 9.00
Stove plate	13.00 to 14.00
Steel axles	16.00 to 17.00
Iron axles	16.00 to 17.00
No. 1 railroad wrought.....	11.00 to 12.00
Rails for rolling	13.00 to 14.00
No. 1 cast	15.00 to 16.00
Tramcar wheels	12.50 to 13.50
Cast iron carwheels	12.00 to 13.00
Cast iron borings, chemical....	13.00 to 13.50

St. Louis

Large Inquiry for Pig Iron—Further Drop in Scrap

ST. LOUIS, June 14.—Sales by the Granite City maker of pig iron fell off considerably during the week, amounting to only about 1500 tons, of which 600 tons of malleable went to an Illinois company for June and July delivery and the remainder consisted of foundry grades in 100 and 200-ton lots. The only inquiry of note calls for 5000 to 8000 tons for third quarter

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and structural shapes.....	3.25c.
Bars, soft steel or iron.....	3.15c.
Cold-finished rounds, shafting and screw stock	3.75c.
Black sheets (No. 24)	4.80c.
Galvanized sheets (No. 24).....	5.35c.
Blue annealed sheets (No. 10).....	3.60c.
Black corrugated sheets	4.65c.
Galvanized corrugated sheets.....	5.30c.
Structural rivets	3.60c.
Boiler rivets	3.80c.
	Per Cent Off List
Tank rivets, 7/8-in. and smaller.....	70
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, square, blank or tapped....	60
Hot-pressed nuts, hexagons, blank or tapped	60

shipment to the Louisville, Ky., plant of the Standard Sanitary Mfg. Co. Prices are unchanged.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b.	
Granite City, Ill.....	\$20.50 to \$21.00
Northern No. 2 fdy., delivered	
St. Louis	22.16
Southern No. 2 fdy., delivered....	22.42
Northern malleable, delivered....	22.16
Northern basic, delivered.....	22.16

Freight rates: 81c. from Granite City to St. Louis; \$2.16 from Chicago; \$4.42 from Birmingham.

Coke.—Business in coke is quiet. Buying of domestic grades, which picked up some in May, has quieted down considerably. There is little doing in foundry coke, on which the local by-product company is quoting \$9.75, ovens.

Finished Iron and Steel.—All lines of finished iron and steel are quiet, the usual summer lull having been accentuated by the recent floods and other unfavorable conditions. Railroads have fully specified against their contracts for track supplies for the first half of the year, and there are no new inquiries for railroad material. Business in structural steel is dull. May building permits in St. Louis, estimated at \$2,769,170, as compared with those of May, 1926, showed a decline of \$1,698,374. Warehouse business is dull.

Old Material.—Heavy railroad lists in the face of light demand from consumers of old material in this district continue to depress the market. Mills in the district will not buy because of lack of orders for finished products, and the only sign of activity is among dealers who are covering outstanding orders. Heavy melting steel, heavy shoveling steel and No. 2 railroad wrought are off 25c. a ton each, and the remainder of the list is weak but unchanged. Railroad lists include: Chesapeake & Ohio, 14,000 tons; Louisville & Nashville, 13,000 tons; Southern Railway, 7000 tons; Rock Island, 6000 tons; Wabash, 2800 tons; Great Northern, 2700 tons; Chicago, Milwaukee & St. Paul, 2600 tons; Missouri-Kansas-Texas, 1800 tons; Nickel Plate, 800 tons; Gulf Coast Lines, 750 tons; and St. Louis-San Francisco, 400 tons.

Prices per gross ton f.o.b. dealers' yards and delivered St. Louis district consumers' works:

Heavy melting steel.....	\$10.75 to \$11.25
No. 1 locomotive tires.....	14.25 to 14.75
Heavy shoveling steel.....	10.75 to 11.25
Miscellaneous standard-section rails, including frogs, switches and guards, cut apart.....	12.50 to 13.00
Railroad springs	13.50 to 14.00
Bundled sheets	8.50 to 9.00
No. 2 railroad wrought.....	10.75 to 11.25
No. 1 busheling	9.75 to 10.25
Cast iron borings	8.75 to 9.25
Iron rails	14.00 to 14.50
Rails for rolling	13.75 to 14.25
Machine shop turnings	6.75 to 7.25
Steel car axles	18.50 to 19.00
Iron car axles	23.00 to 23.50
Wrought iron bars and transoms	18.50 to 19.00
No. 1 railroad wrought.....	12.00 to 12.50
Steel rails, less than 3 ft.....	15.50 to 16.00
Steel angle bars	11.75 to 12.25
Cast iron carwheels	13.50 to 14.00
No. 1 machinery cast.....	17.00 to 17.50
Railroad malleable	11.50 to 12.00
No. 1 railroad cast	15.00 to 15.50
Agricultural malleable	11.50 to 12.00
Relaying rails, 60 lb. and under....	20.50 to 23.50
Relaying rails, 70 lb. and over....	26.50 to 29.00

No Signs of Strength in Detroit Scrap Market

DETROIT, June 14.—No evidences of any strengthening in the scrap market in this district have appeared during the past week, and mills and furnaces do not seem anxious to cover future requirements. Stove and furnace manufacturers with few exceptions are operating on a lower basis than a year ago. Prices are unchanged.

Per Gross Ton

Heavy melting and shoveling steel	\$12.50 to \$13.00
Borings and short turnings.....	8.25 to 8.75
Long turnings	7.50 to 8.00
No. 1 machinery cast.....	17.00 to 18.00
Automobile cast	19.00 to 20.00
Hydraulic compressed	11.00 to 11.50
Stove plate	13.50 to 14.50
No. 1 busheling.....	10.50 to 11.00
Sheet clippings	8.00 to 8.50
Flashings	10.50 to 11.00

Boston

Foundry Melt Diminishing—Finished Steel Prices Softer

BOSTON, June 14.—The Mystic Iron Works in the past week sold 5000 to 6000 tons of pig iron, most of it for consumption outside of New England. Foundries in this territory are buying only occasionally and then in small lots, aggregate sales in the past week for New England consumption approximating not more than 2000 tons. The foundry industry is still in a depression, and the weekly melt is decreasing rather than increasing owing to the slack condition of the jobbing business. Producers east of Buffalo are quoting \$18.50 to \$20, base furnace, for No. 2 plain. One New York State furnace is asking a differential of 50c. a ton on No. 2X and No. 1X grades, but two other nearby stacks have been waiving this in numerous instances.

Prices of foundry iron per gross ton, delivered to most New England points:

Buffalo, sil. 1.75 to 2.25	\$22.41 to \$22.91
Buffalo, sil. 2.25 to 2.75	22.91 to 23.41
East. Penn., sil. 1.75 to 2.25	24.15 to 24.65
East. Penn., sil. 2.25 to 2.75	24.65 to 25.15
Virginia, sil. 1.75 to 2.25	27.42
Virginia, sil. 2.25 to 2.75	27.92
Alabama, sil. 1.75 to 2.25	24.91 to 26.77
Alabama, sil. 2.25 to 2.75	25.41 to 27.27

Freight rates: \$4.91 from Buffalo, \$3.65 from eastern Pennsylvania, \$5.92 from Virginia, \$6.91 to \$8.77 from Alabama.

Cast Iron Pipe.—Peabody, Mass., will close bids June 24 on 200 tons of 6-in. and larger pipe. Revere, Mass., has taken under advisement bids for 718 tons of 6 to 14-in. pipe, recently received. It is reported a large Massachusetts gas company will close bids this week on 6000 tons of gas pipe. Otherwise business in pipe is of a private nature. Prices quoted openly on domestic pipe are: 4-in., \$58.10 a ton, delivered common Boston freight rate points; 6 to 12-in., \$53.10 to \$54.10; larger pipe, \$52.10 to \$53.10. A \$5 differential is asked on Class A and gas pipe.

Finished Material.—Prices on finished material are easier. Structural shapes are now quoted at 1.75c., base Pittsburgh, contrasted with 1.80c. heretofore; plates are offered at 1.80c., as against 1.85c., and on a sizable tonnage could be had for 1.75c. Bars are slow at 1.75c., or \$1 to \$2 a ton lower than they were a month ago, while cold-rolled rounds are quoted at low as 2.30c. Orders placed with mills in most instances are small, and for fairly prompt shipment.

Coke.—The movement of by-product foundry coke from ovens to foundry continues at a steady gait. It is somewhat behind that of a year ago and about equal to that of a month ago. The New England Coal & Coke Co. and the Providence Gas Co. continue to quote foundry fuel at \$12 a ton, delivered, within a \$3.10 freight rate zone. Good Connellsville foundry coke is available at \$1.50 to \$2 a ton less, with a few distress lots selling at even greater concessions, but little is moving into New England. Competition for domestic coke business in western New England is growing. Following the establishment of a distributing plant at

Adams, Mass., the Hudson Valley Coke Sales Corporation is about to place another at Pittsfield, Mass.

Imports.—Receipts of foreign iron at this port in May consisted of 868 tons of Dutch, 109 tons of Indian, 30 tons of Belgian and 20 tons of Swedish, or a total of 1027 tons, contrasted with 110 tons in April, and with 3979 tons in May, last year.

Old Material.—Within two weeks a large consignment, amounting to several thousand tons of yard scrap, will be exported from Boston. While information regarding the point of delivery is withheld, it is reported to be Italy. Against this shipment the exporters are paying \$8.50 a ton at steamer. Shafting and street car axles are about 50c. a ton lower, but the drop in other old material prices apparently has been checked. Dealers are still indifferent to steel mill offers; consequently little material is going out of New England except on old orders. Mills continue to make rejections, even on material that costs as little as \$5 a ton, on cars, shipping point. No material increase in business is anticipated by Boston brokers much before the latter part of August.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	\$9.00 to \$9.50
Scrap rails	8.50 to 9.00
No. 1 railroad wrought	11.50 to 12.00
No. 1 yard wrought	9.00 to 9.50
Machine shop turnings	4.75 to 5.25
Cast iron borings (steel works and rolling mill)	5.50 to 6.00
Bundled skeleton, long	5.00 to 5.25
Forged flashings	5.50 to 6.00
Blast furnace borings and turnings	5.00 to 5.50
Forged scrap	6.00 to 6.50
Shafting	13.00 to 13.50
Street car axles	13.50 to 14.00
Wrought pipe (1 in. in diameter, over 2 ft. long)	8.00 to 8.50
Rails for rerolling	11.00 to 11.50
Cast iron borings, chemical	10.50 to 11.00

Prices per gross ton, delivered consumers' yards:

Textile cast	\$14.50 to \$15.50
No. 1 machinery cast	14.50 to 15.00
No. 2 machinery cast	12.50 to 13.00
Stove plate	12.00 to 12.50
Railroad malleable	14.50 to 15.00

Cincinnati

Large Sales of Pig Iron—Another Drop in Heavy Melting

CINCINNATI, June 14.—Pig iron sales in the past week have been the largest this year, total bookings amounting to approximately 20,000 tons. The Standard Sanitary Mfg. Co. has bought about 8000 tons of Northern iron for its Louisville, Ky., plant, and it is understood that this order has been divided between Ironton, Ohio, furnaces and a Granite City, Ill., producer. The former are reported to have submitted a price which will yield \$19, or better, at Ironton, provided that shipment is made by barge. Several other important transactions have been closed. One calling for 5000 tons of foundry and another for 1000 tons. In most cases third quarter delivery is specified, although some buyers are contracting for last half requirements. In order to compete successfully against northern Ohio sellers who are soliciting business in this

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars and small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway, squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tire steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hexagons	4.05c.
Squares and flats	4.55c.
Toe calk steel	6.00c.

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and structural shapes	3.40c.
Bars, soft steel or iron	3.30c.
Reinforcing bars	3.30c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-finished rounds and hexagons	3.85c.
Squares	4.35c.
Open-hearth spring steel	4.75c. to 5.00c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue annealed sheets (No. 24)	3.60c.
Structural rivets	3.85c.
Small rivets	.65 per cent off list
No. 9 annealed wire, per 100 lb.	\$3.00
Common wire nails, base per keg	2.95
Cement coated nails, base per 100 lb. keg	2.95
Chain, per 100 lb.	7.55
Net per 100 Ft.	
Lap welded steel boiler tubes, 2-in.	\$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in.	19.00
4-in.	39.00

territory at \$17.50, base furnace, a company in this district has been compelled to go as low as \$18.25 to \$18.50, base furnace, on malleable grades. This quotation, however, applies only on sizable lots, for at some consuming points \$18.75 to \$19 better represents the market. Southern iron is steady at \$18, base Birmingham, and the fact that Southern furnaces did not participate in the Standard Sanitary tonnage is a confirmation of the opinion that they are in a strong position so far as future orders are concerned. Jackson County silvery iron is showing strength. Inquiries are more numerous. The Anderson Stove Co., Anderson, Ind., is asking for 1200 tons of foundry, and the Louisville & Nashville expects to take 550 tons of foundry and 150 tons of charcoal iron.

Prices per gross ton, delivered Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25....	\$20.89
So. Ohio malleable.....	\$20.14 to 20.89
Alabama fdy., sil. 1.75 to 2.25....	21.69
Alabama fdy., sil. 2.25 to 2.75....	22.19
Tennessee fdy., sil. 1.75 to 2.25....	21.69
Southern Ohio silvery, 8 per cent	30.39

Freight rates: \$1.89 from Ironton and Jackson, Ohio; \$3.69 from Birmingham.

Finished Material.—Orders and specifications placed in the past week have been of generous volume. In most cases consumers are carrying meager stocks and are relying upon prompt mill shipments to supply their current needs. Jobbers likewise are guarding against building up substantial inventories. Demand for structural steel has been about normal for this time of the year. A spotty condition exists in the fabricating field, plants in some cities being extremely busy and in other cities being in need of work. Prices on structural steel and bars have settled to a basis of 1.85c., Pittsburgh, despite the attempt of producers to retain the former schedule of 1.90c. The general situation in the sheet market is encouraging. Mills are holding to 3c., base Pittsburgh, on black sheets, 3.85c. on galvanized and 2.25c. on blue annealed, and third quarter business is being taken strictly at those quotations. Companies making special grades of sheets, such as enameled stock, report that sales have been good. The automobile industry is specifying rather liberally against current contracts. Mill operations continue at about 95 per cent of capacity, although a letdown is anticipated within the next few weeks. Wire goods have been moving at a fair rate. A producer is reported to be offering common wire nails at \$2.64 per keg, delivered Cincinnati. This is equivalent to \$2.50 at mill plus a 14c. barge rate. Orders for cold-rolled bars have been moderate in volume.

Reinforcing Bars.—There has been a slight stiffening in prices, with more sales of rail steel bars at 1.80c., base mill, reported. On attractive tonnages, however, 1.75c. is obtainable. New billet bars continue at 1.85c. to 1.90c., base Pittsburgh.

Warehouse Business.—Increased activity in structural steel and bars has caused sales to run ahead of those in May. If bookings are sustained at the current rate during the remainder of the month, June will be the best month of the year. Local jobbers are putting into effect, June 15, a new list of differentials on cold-drawn steel applying to orders less than 500 lb. in size. On orders for less than 100 lb. the extra will be \$1 per 100 lb.; from 100 to 299 lb., 75c., and from 300 to 499 lb., 50c. The growing cost of labor and of haulage on small lots of material was the prime reason for establishing the new list of extras. Otherwise, prices are unchanged.

Coke.—There has been no substantial change in the coke market. Specifications against current contracts have been only fair, and general conditions give no indication of an improvement during the remainder of June. The Procter & Gamble Co. is expected to close this week for 8000 tons of beehive furnace coke, while the Louisville & Nashville is inquiring for 630 tons of 72-hr. foundry coke for third quarter delivery. Prices have not been altered.

Foundry coke prices per net ton, delivered Cincinnati: By-product coke, \$9.52 to \$9.64; Wise County coke, \$7.59 to \$8.09; New River coke, \$10.09 to \$10.59. Freight rates: \$2.14 from Ashland, Ky.; \$2.59 from Wise County and New River ovens.

Old Material.—A further recession in sales is noted, the result being reflected in another reduction of 25c. a ton in heavy melting steel. A few other items also have been adversely affected by the dullness of the market. With mills contemplating curtailment of production, necessitated by the smaller volume of fresh bookings, steel plant grades are moving sluggishly. Dealers are of the opinion that an upturn in activities will not come until early fall.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel.....	\$11.50 to \$12.00
Scrap rails for melting.....	13.00 to 13.50
Loose sheet clippings.....	8.50 to 9.00
Champion bundled sheets.....	9.50 to 10.00
Cast iron borings.....	8.75 to 9.25
Machine shop turnings.....	7.75 to 8.25
No. 1 busheling.....	9.50 to 10.00
No. 2 busheling.....	7.00 to 7.50
Rails for rolling.....	14.00 to 14.50
No. 1 locomotive tires.....	14.50 to 15.00
No. 1 railroad wrought.....	11.50 to 12.00
Short rails.....	17.50 to 18.00
Cast iron carwheels.....	13.00 to 13.50
No. 1 machinery cast.....	17.50 to 18.50
No. 1 railroad cast.....	14.50 to 15.00
Burnt cast.....	8.50 to 9.00
Stove plate.....	10.00 to 10.50
Brake shoes.....	10.25 to 11.00
Railroad malleable.....	13.00 to 13.50
Agricultural malleable.....	12.50 to 13.00

Buffalo

Pig Iron Weaker—Good Demand for Bars and Sheets

BUFFALO, June 14.—Inquiry for pig iron is light, and placements are small. The Eastern Malleable Iron Co., Naugatuck, Conn., is understood to have bought against its inquiry for 2500 to 5000 tons and a local inquiry for 1500 tons of malleable has been placed. On the larger tonnages \$17.50, Buffalo, is the going price, though the market is being held firmly at \$18 on the smaller lots. It is reported that on a recent inquiry for 3000 tons of foundry better than \$17.50 was done by the buyer, but this has not been confirmed.

Prices per gross ton, f.o.b. Buffalo furnace:

No. 2 plain fdy., sil. 1.75 to 2.25....	\$17.50 to \$18.00
No. 2X foundry, sil. 2.25 to 2.75....	18.00 to 18.50
No. 1X foundry, sil. 2.75 to 3.25....	19.00 to 19.50
Malleable, sil. up to 2.25.....	17.50 to 18.00
Basic.....	17.50 to 17.75
Lake Superior charcoal.....	27.28

Finished Iron and Steel.—Business in bars is in fair volume. Bars are held nominally at 2.165c., Buffalo, but the larger buyers are able to do 2.115c. Sheet prices are firmer than they have been for some time at 3c., base Pittsburgh, for black; 3.85c. for galvanized; 2.25c. for blue annealed and 4.25c. for automobile body. Inquiry for third quarter sheets is developing well. One of the important lots recently placed was 1500 tons of black sheets. Business in bolts is in good volume, and jobbers are beginning to contract for the third quarter. There has been no shading of prices so far. The small jobbers are getting the same price as the larger jobbers. Pipe is less active, but reinforcing bars are in good demand. Several hundred tons of road work is scheduled to come out shortly. An award of 1275 tons of structural steel for a local downtown store is a feature of the week.

Old Material.—There has been a softening of prices all along the line. Sales are not heavy. The top of the spread on heavy melting steel, \$15.50, represents the price paid at delivery point, minus the switching charge, on a railroad list. There has been a little buying of No. 1 cast in carload and 100 to 150-ton lots.

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and structural shapes.....	3.40c.
Soft steel bars.....	3.30c.
Reinforcing bars.....	2.75c.
Cold-finished flats, squares and hexagons.....	4.45c.
Rounds.....	3.95c.
Cold rolled strip steel.....	5.85c.
Black sheets (No. 24).....	4.30c.
Galvanized sheets (No. 24).....	5.15c.
Blue annealed sheets (No. 10).....	3.80c.
Common wire nails, base per keg.....	\$3.65
Black wire, base per 100 lb.....	3.90

Stove plate is scarce, and there has been no new buying of it. Production of scrap has dropped off considerably on account of curtailed operations in automobile plants.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades		
No. 1 heavy melting steel.....	\$15.00 to	\$15.50
No. 2 heavy melting steel.....	14.00 to	14.25
Scrap rails	15.00 to	15.50
Hydraulic compressed sheets....	12.75 to	13.25
Hand-bundled sheets	9.50 to	10.00
Drop forge flashings.....	12.75 to	13.25
No. 1 busheling.....	13.50 to	14.00
Heavy steel axle turnings.....	12.50 to	13.00
Machine shop turnings.....	9.00 to	9.50
Acid Open-Hearth Grades		
Railroad knuckles and couplers..	16.75 to	17.25
Railroad coil and leaf springs...	16.75 to	17.25
Rolled steel wheels.....	16.75 to	17.25
Low phosphorus billet and bloom ends	17.50 to	18.00
Electric Furnace Grades		
Heavy steel axle turnings.....	14.00 to	14.50
Short shoveling steel turnings...	10.75 to	11.00
Blast Furnace Grades		
Short shoveling steel turnings...	10.75 to	11.00
Short mixed borings and turnings	10.00 to	10.50
Cast iron borings.....	10.75 to	11.00
No. 2 busheling.....	11.00 to	11.50
Rolling Mill Grades		
Steel car axles.....	16.00 to	16.50
No. 1 railroad wrought.....	13.00 to	13.50
Cupola Grades		
No. 1 machinery cast.....	16.00 to	16.25
Stove plate	14.00 to	14.25
Locomotive grate bars.....	12.50 to	13.00
Steel rails, 3 ft. and under.....	17.00 to	17.50
Cast iron carwheels.....	15.00 to	15.50
Malleable Grades		
Railroad	16.00 to	16.50
Agricultural	15.50 to	16.00
Industrial	15.50 to	16.00

Improvement in Sheets and Pipe in Mahoning Valley

YOUNGSTOWN, June 11.—New business is holding up well with Mahoning Valley steel companies, weekly schedules for the first full week in June reveal, showing betterment affecting steel-making, sheets and pipe. Seamless tube capacity in this area is now active at 50 per cent, against a recent rate of 25 per cent. This week the mid-west sheet trade is benefiting from improved specifications, with the result that 111 mills are scheduled, out of 127, a gain from 92 active units the previous week. In pipe mills, 13 are rolling, against a low recently of 11. There is some betterment in demand for butt weld pipe, the Republic Iron & Steel Co. reports. Of the 39 blast furnaces in the Youngstown district, 24 are now in action.

The Youngstown Sheet & Tube Co. has started one of its two blast furnaces in the group at Hubbard, Trumbull County. The unit will supply hot metal to the new plant at Hubbard of the Valley Mould & Iron Corporation, which is about to get under way. This resumption gives the Sheet & Tube company five active furnaces of six at the Ohio Works. For several months, the inactive stack has been undergoing repairs, which are now nearly completed. It is unlikely, however, that the furnace will resume until next quarter.

The Carnegie company is operating its rolling mills in the Youngstown area at 80 per cent, and its blast furnaces and steel plant at 85 per cent. The Trumbull Steel Co. is maintaining production at 82 per cent, its Liberty tin mill property being inactive for the time being.

The Ford Motor Co. is coming into the market for sheets and strips in heavier tonnages, and this buying is expected to improve materially the position during the summer months of the companies manufacturing strictly "flat" products.

Secondary companies at Youngstown are maintaining production generally above 90 per cent. The General Fireproofing Co. reports that May established a new monthly record for it in output and shipments, much of its production going to foreign countries. Last month the company made shipments to 44 different foreign countries, including tropical countries. Builders of mill equipment, such as the United Engineering & Foundry Co. and the Aetna-Standard Engineering Co. are reaping the benefit from the scrapping of obsolete rolling mill equipment, and substitution of newer ma-

chinery. This business is expected to develop in heavy volume during the next two years.

Accidents in Metallurgical and Mechanical Fields

Accidents at metallurgical works in the United States in 1925 are covered in a 40-page pamphlet of the Bureau of Mines, Technical Paper 412, prepared by William W. Adams. Copies may be obtained at 10c. from the Superintendent of Documents, Government Printing Office, Washington. The death rate from accidents was reduced practically 25 per cent from that of the preceding year, while the non-fatal accident rate was reduced more than 11 per cent. The figures were based on a study of 58,935 men employed.

Studies of accidents in manufacturing and mechanical occupations made by the National Industrial Conference Board, New York, show for all industries in 1925 an average of one death for each 2500 workers. The total number of accidents, including those resulting in death, is reported at 73.45 for each 1000 workers. The report covering 13 specific industries is based on a study of 828,025 workers.

Frequency of accidents was greatest in mining, at 24 per cent of the total number of workers. Construction work showed 16.76 per cent, the metal industry 7.8 per cent, automotive industry 5.62 per cent, and others varying rates. The lowest of all was the textile industry, with 3.27 per cent.

Improvement in Patent Office Procedure

Since October, 1924, a committee of the American Engineering Council has been working with Patent Office officials in an endeavor to improve the procedure of the office, eliminate delays and reduce costs. Some of the outstanding accomplishments which have resulted from the work of this committee are outlined by L. W. Wallace, executive secretary American Engineering Council.

Applications must be amended within six months instead of one year; renewals must be made within one year instead of two; time allowed for appeals is reduced from one year to six months. One appeal within the Patent Office has been abolished. These changes will greatly facilitate handling of cases. Only one appeal can be made outside the patent office—a provision which will reduce the cost and expedite patent litigation.

All patents in the public search room are being checked, and missing patents placed in the files. Formerly the files did not contain a complete set.

Photostat copies of the drawings in each application are made and placed on file at time application is received. This guards against loss and is of help in other ways. Original drawings may be used in applications for reissue, eliminating expense of new drawings and also guarding against error. Assignments are recorded by the photostat method, saving a number of clerks and reducing the time for recording from 52 to 15 days.

Card indexes for assignments have been completed and have proven to be the biggest item of saving accomplished. Adequate stenographic service has saved the time required by examiners in writing long-hand decisions. Reorganization of the work of the application division itself puts through the work in small lots in a steady flow. The former method of large batches, resulting in alternate peaks and valleys of the work, was inefficient. Other changes are being considered which will further improve the service.

Railroad Equipment

The Chicago & Illinois Midland has ordered 350 70-ton gondola cars from the Pullman Car & Mfg. Corporation. The Union Pacific has ordered six 20-yd. air-dump cars from the Western Wheeled Scraper Co.

The Chicago, North Shore & Milwaukee is in the market for 20 interurban electric coaches.

The American Rolling Mill Co. will buy two 6-wheel switching locomotives.

The Bessemer & Lake Erie is in the market for a locomotive tender.

FABRICATED STRUCTURAL STEEL

Week's Awards Close to 30,000 Tons and Inquiries Total 27,000 Tons

Structural steel lettings continue in fairly good volume, the total for the week being about 30,000 tons, with none of outstanding size. Inquiries total 27,000 tons, including 7000 tons for a grandstand at Arlington, Ill., and 4000 tons for a tower in Grant Park, Chicago. Awards follow:

SOMERVILLE, MASS., 237 tons, Agar Mfg. Co. plant, to Lehigh Structural Co.
 NEW YORK, 6000 tons, New York Athletic Club, to American Bridge Co.; as previously reported, fabrication and erection by Post & McCord.
 NEW YORK, 1650 tons, Bronx River bridge, to McClintic-Marshall Co.
 NEW YORK, 275 tons, boiler house for Todd Shipyards Corporation, to Shoemaker Bridge Co.
 NEW YORK, 150 tons, station platforms, Interborough Rapid Transit Co., to American Bridge Co.
 NEW YORK, 1000 tons, three theaters, to George A. Just Co.
 NEW YORK, 2470 tons in the following awards as reported to the Structural Steel Board of Trade, Inc.: Holy Trinity School and Rectory, 212-218 West Eighty-third Street, to George A. Just Co.; alteration to Benenson Building, 165 Broadway, 10-story store building, Hoyt and Livingston Streets, Brooklyn, and one-story extension, 250 Fulton Avenue, Hempstead, L. I., to Hay Foundry & Iron Works.
 NEW YORK, 1075 tons, 12-story apartment building, University Place and East Tenth Street, to Easton Structural Steel Co.
 NEW YORK, 700 tons, 15-story apartment building, Eleventh Street and Second Avenue, to Dreier Iron Works.
 NEW YORK, 470 tons, 16-story apartment building, 71 Washington Square, to Dreier Iron Works.
 NEW YORK, 1250 tons, 10-story apartment building, 177 East Seventy-seventh Street, to Bethlehem Fabricators, Inc.
 NEW YORK, 285 tons, Church of the Holy Spirit, Union Avenue, the Bronx, to Kues Brothers.
 BROOKLYN, 2000 tons, warehouse for Ludwig Baumann & Co., to Hay Foundry & Iron Works.
 FAR ROCKAWAY, N. Y., 220 tons, four-story office building, to National Bridge Works.
 MOUNT VERNON, N. Y., 175 tons, City Hall, to Peerless Iron Works.
 HOOSICK FALLS, N. Y., 170 tons, bridge, to an unnamed fabricator.
 PHILADELPHIA, 1000 tons, manufacturing building for General Electric Co., to American Bridge Co.
 PENNSYLVANIA RAILROAD, 220 tons, bridge at Toledo, Ohio, to McClintic-Marshall Co.
 READING RAILROAD, 200 tons, bridge at Sinking Spring, Pa., to Shoemaker Bridge Co.
 AKRON, OHIO, 200 tons, county highway bridge at Boston Mills, to Forest City Structural Steel Co.
 BUFFALO, 1275 tons, 10-story commercial building, West Genesee and Pearl Streets, for A. Victor & Co., from John W. Cowper Co., Inc., general contractor, to R. S. McMannus Steel Construction Co.
 BUFFALO, 100 tons, rebuilding refrigerating, chilling and press building for Standard Oil Co., Atlas works, from John W. Cowper Co., Inc., to R. S. McMannus Steel Construction Co.
 NEW BRUNSWICK, N. J., 275 tons, hospital, to American Bridge Co.
 READING RAILROAD, 200 tons, bridges, to Shoemaker Bridge Co.
 LEHIGH VALLEY RAILROAD, 750 tons, tunnel supports, to Bethlehem Steel Co.
 PHILADELPHIA, 2400 tons, Wiltshire Building, to Shoemaker Bridge Co.
 PENSACOLA, FLA., 1300 tons, United States hangars, to an unnamed local fabricator.
 SAGINAW, MICH., 125 tons, bank building, to Guilbert Steel Co., Pittsburgh.
 SANDUSKY, 1600 tons, Sandusky Bay automobile bridge, to Mount Vernon Bridge Co.
 WAUKEGAN, ILL., 300 tons, building for North Shore Coke & Chemical Co., to Worden-Allen Co.
 CHICAGO, 180 tons, apartment building on West Madison Street, to Federal Iron Works, Chicago.
 ST. LOUIS, 100 tons, building for Patterson Baking Co., to Mississippi Valley Structural Steel Co.
 KANSAS CITY, MO., 130 tons, four-story top addition to Dwight Building, to St. Louis Structural Steel Co.
 BELLEFONTAINE, MO., 2100 tons, bridge, to American Bridge Co.
 CLEBURNE, TEX., 2800 tons, Santa Fe shops, to McClintic-Marshall Co.
 TALPA, TEX., 500 tons, lumber mill, to Kansas City Structural Steel Co.
 PORTLAND, ORE., 800 tons, office building, Fifth and Morrison Streets, to Poole & McGonigle, Portland.

BERKELEY, CAL., 250 tons, church on Dana Street, to Pacific Coast Engineering Co., Oakland.
 SACRAMENTO, CAL., 100 tons, church at Thirteenth and N Streets, to Palm Iron Works, local.
 SAN JOSE, CAL., 155 tons, building for the San Jose Mercury-Herald, to Golden Gate Iron Works.
 SAN FRANCISCO, 220 tons, office building on Mission Street, to Pacific Rolling Mill Co.
 SAN FRANCISCO, 150 tons, apartment building, Broadway and Gough Street, to Golden Gate Iron Works.
 SPOKANE, WASH., 728 tons, municipal pipe line; 537 tons to Steel Tank & Pipe Co., and 191 tons to Beale Tank & Pipe Co.

Structural Projects Pending

CAMBRIDGE, MASS., tonnage unstated, aeronautical laboratory, Massachusetts Institute of Technology.
 PROVIDENCE, R. I., 200 tons, dormitory, House of Good Shepherd.
 HARTFORD, CONN., 300 tons, State bridge Poquetanock Cove.
 HARTFORD, CONN., 300 tons, power plant, Hartford Electric Light Co.
 NEW YORK, 1600 tons, addition to St. Regis Hotel, Fifth Avenue and Fifty-fifth Street.
 NEW YORK, 300 tons, garage, 216th Street and Tenth Avenue.
 NEW YORK, 300 tons, apartment building, 238-242 West Seventy-third Street.
 NEW YORK, 750 tons, office building, 149th Street and Cortlandt Avenue.
 NEW YORK, 700 tons, All Hallows Institute, 13 West 124th Street.
 NEW YORK, 550 tons, Hanna-Lavenburg Building, 331 East Twelfth Street.
 NEW YORK, 1500 tons, office building, Madison Avenue and Sixtieth Street.
 NEW YORK, 400 tons, Chapin School, Eighty-fourth Street and East End Avenue.
 NEW YORK, 200 tons, hospital, 141st Street and Southern Boulevard.
 NEW YORK, 150 tons, office building, 151 West Forty-sixth Street.
 NEW YORK, 250 tons, office building, 236 West Seventy-second Street.
 NEW YORK, 1850 tons, apartment building, 1060 Fifth Avenue.
 NEW YORK, 2500 tons, printing building, Eighth Avenue.
 NEW YORK, 1100 tons, apartment building, East Eighty-seventh Street, Dwight P. Robinson & Co., Inc., general contractor.
 NEW YORK, 500 tons, apartment building, East Seventy-ninth Street; James Stewart & Co., Inc., general contractor.
 BROOKLYN, 625 tons, apartment building, 52 Clark Street.
 BROOKLYN, 300 tons, office building, Coney Island.
 WHITE PLAINS, N. Y., 125 tons, Hall of Records.
 JAMAICA, N. Y., 2000 tons, Roman Catholic school.
 FLUSHING, N. Y., 700 tons, addition to Flushing Hospital.
 FLUSHING, 1025 tons, Keith's Theater.
 LAURELTON, N. Y., 250 tons, building for New York Telephone Co.
 ROCHESTER, N. Y., 700 tons, League baseball stands.
 PENNSYLVANIA RAILROAD, 1000 tons, electric substations on Wilmington branch; bids closed June 15.
 LYCOMING COUNTY, PA., 160 tons, State highway bridges.
 SALEM TOWNSHIP, N. J., 100 tons, bridge.
 NEW YORK CENTRAL RAILROAD, 160 tons, roundhouse at Harmon, N. Y.
 CLEVELAND, 2000 tons, wings to public hall; new bids asked for.
 CLEVELAND, 600 tons, Pennsylvania Railroad track elevation.
 CANTON, OHIO, 200 tons, tuberculosis hospital.
 NEWARK, N. J., 1800 tons, Fox Theater.
 NEWARK, 300 tons, office building.
 ELIZABETH, N. J., 600 tons, 10-story office building.
 JERSEY CITY, 1400 tons, Labor National Bank.
 BALTIMORE & OHIO RAILROAD, 150 tons, bridges.
 BALTIMORE, 300 tons, hospital for Johns Hopkins University.
 MIAMI, FLA., 650 tons, public school.
 DETROIT, 725 tons, L'Envol subway and bridge.
 DETROIT, 170 tons, Mullett Street bridge for Grand Trunk Railroad.
 ARLINGTON, ILL., 7000 tons, grandstand.
 CHICAGO, 4000 tons, light tower for Grant Park.
 CAMERON, WIS., 200 tons, creamery.
 ST. LOUIS, 200 tons, gymnasium in metropolitan police headquarters building.
 RIGOLETS, 1100 tons, bridge.
 DENVER, COLO., 13 miles of 66-in. pipe.
 SAN ANGELO, TEX., 1500 tons, oil tanks.
 PHOENIX, ARIZ., 1000 tons, Grand Canyon bridge at Lee's Ferry; Kansas City Structural Steel Co. low bidder.
 LOVELOCK, NEV., 600 tons, sheet piling for a dam; bids in.
 GRASS VALLEY, CAL., 500 tons, pipe line for Nevada Irrigation District, Steel Tank & Pipe Co., Berkeley, low bidder.
 SAN FRANCISCO, 190 tons, apartment building on Hyde Street.
 LOS ANGELES, 100 tons, galvanized structural steel for the Water and Power Commission.

NON-FERROUS METAL MARKETS

The Week's Prices

Cents per Pound
for
Early Delivery

	June 14	June 13	June 11	June 10	June 9	June 8
Lake copper, New York....	12.75	12.75	12.75	12.75	12.87½	12.87½
Electrolytic copper, N. Y.*..	12.37½	12.37½	12.37½	12.37½	12.50	12.50
Straits tin, spot, New York.	67.75	68.00	...	67.75	67.75	67.70
Lead, New York.....	6.45	6.45	6.45	6.45	6.45	6.45
Lead, St. Louis.....	6.15	6.15	6.15	6.15	6.15	6.15
Zinc, New York.....	6.65	6.62½	6.60	6.60	6.60	6.62½
Zinc, St. Louis.....	6.30	6.27½	6.25	6.25	6.25	6.27½

*Refinery quotation; delivered price ¼c. higher.

NEW YORK, June 14.—Quietness pervades most of the markets and the price tendency is higher in some and lower in others. Copper is again declining but buying is light. The tin market has been fairly active with prices practically unchanged. Lead has been in poor demand but quotations are firm. Due to the attitude of sellers, zinc is higher but buying is light. Yesterday, "Lindbergh Day" in New York, practically no business was done, but quotations were regarded as nominal.

Copper.—Statistics for May were made public today and show that stocks of refined metal had increased last month 9000 tons over April and that mine production had changed but little. Shipments into consumption, both domestic and foreign, declined 13,000 tons which in part explains the increase in stocks. Following the fairly heavy buying of two or three weeks ago, consumers are indifferent and the market for both foreign and domestic shipment is exceedingly dull. As a natural consequence quotations are slipping and electrolytic copper today is quoted at 12.62½c., delivered in the Connecticut Valley. The official price of Copper Exporters, Inc., still stands at 13.10c. per lb. c.i.f. Hamburg. It is pointed out that present low prices have in a measure discounted the unfavorable statistics which have prevailed recently and that the market is not likely to go much lower. The resistance point in the past has been 12.50c., delivered. Lake copper is quoted at 12.75c., delivered.

Tin.—Although the market is quieter, at least 10,000 tons changed hands during the week ended Sat-

urday, June 11. Consumers showed some interest and purchased August and September delivery, but most of the buying was by dealers. On June 7 the principal business transacted was in June delivery. Yesterday and on Saturday practically no business was done, with quotations nominal the latter day. Today, Tuesday, the market has been quiet with spot Straits quoted at 67.75c., New York. A little business was done in June delivery with the market easy at the close. London prices today were a little lower than a week ago with spot standard quoted at £294 17s. 6d., future standard at £286 12s. 6d. and spot Straits at £309 17s. 6d. The Singapore price today was £294 5s. Arrivals thus far this month have been 2300 tons with 4785 tons reported afloat.

Lead.—The volume of business is not as large as it was but quotations are firm. The leading interest continues to quote and do some business at 6.40c., New York, as its contract price, but in the outside market considerable business has been done at 6.45c., New York, or 6.15c., St. Louis.

Zinc.—Statistics for May, recently made public, show an increase of only about 800 tons of stocks of refined metal with the number of retorts active at the end of May less by about 3000 than at the end of April. The favorable trend shown by these statistics has been known for some time, causing sellers to be less interested in doing business, thus favorably affecting prices. As a result quotations today are firm at 6.30c. to 6.32½c., St. Louis, strengthened also by higher values at London. Buying is reported as exceedingly light.

Antimony.—The market is quiet and Chinese metal is available for all positions at 12.50c. per lb., New York, duty paid.

Nickel.—Wholesale lots of ingot nickel continue available at unchanged prices of 35c., with shot nickel at 36c. and electrolytic nickel at 39c. per lb.

Aluminum.—Virgin metal, 98 to 99 per cent pure, in ingots, is available at 25c. to 26c. per lb., delivered.

Non-Ferrous Rolled Products

Mill prices on bronze, brass and copper products have not changed since May 27. Zinc sheets and lead full sheets are being quoted at the reductions of April 25 and May 16 respectively.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	17.75c.
Copper, hot rolled	21.50c.
Zinc	9.75c.
Lead (full sheets)	10.00c. to 10.25c.
Seamless Tubes—	
High brass	22.62½c.
Copper	23.50c.
Rods—	
High brass	15.50c.
Naval brass	18.25c.
Wire—	
Copper	14.75c.
High brass	18.25c.
Copper in Rolls	20.37½c.
Brazed Brass Tubing	25.75c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of the Mississippi River and also allowed to St. Louis on shipments to destinations west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide....	35.50c.
Tubes, base	45.00c.
Machine rods	34.00c.

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	69.50c. to 70.50c.
Tin, bar	71.50c. to 72.50c.
Copper, Lake	14.00c.
Copper, electrolytic	13.75c.
Copper, casting	13.25c.
Zinc, slab	7.25c. to 8.25c.
Lead, American pig	7.50c. to 8.50c.
Lead, bar	9.50c. to 10.50c.
Antimony, Asiatic	15.00c. to 15.50c.
Aluminum No. 1 ingot for remelting (guaranteed over 99 per cent pure)	29.00c. to 30.00c.
Babbitt metal, commercial grade	30.00c. to 40.00c.
Solder, ½ and ½	42.00c. to 43.00c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	73.50c.
Tin, bar	75.50c.
Copper, Lake	14.00c.
Copper, electrolytic	14.00c.
Copper, casting	13.25c.
Zinc, slab	8.00c.
Lead, American pig	7.25c.
Antimony, Asiatic	18.00c.
Lead, bar	9.00c.
Babbitt metal, medium grade	21.50c.
Babbitt metal, high grade	78.50c.
Solder, ½ and ½	43.50c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	17.75c. to 18.50c.
Copper, hot rolled	21.50c. to 22.50c.
Copper, cold rolled, 14 oz. and heavier,	23.75c. to 24.75c.
Seamless Tubes—	
Brass	22.62½c. to 23.62½c.
Copper	23.50c. to 24.50c.
Brazed Brass Tubes	25.75c. to 26.75c.
Brass Rods	15.50c. to 16.50c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks.....	10.50c. to 11.00c.
Zinc sheets, open.....	11.00c. to 11.25c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

Sheets—		Base per Lb.
High brass	.....	18.75c.
Copper, hot rolled	.....	21.50c.
Copper, cold rolled, 14 oz. and heavier	.....	23.75c.
Zinc	.....	11.00c.
Lead, wide	.....	10.00c.
Seamless Tubes—		
Brass	.....	24.12½c.
Copper	.....	25.00c.
Brazed Brass Tubes	.....	28.00c.
Brass Rods	.....	15.50c.

Non-Ferrous Metals at Chicago

June 14.—The non-ferrous metal market is quiet and prices, with the exception of tin, are unchanged. Demand for old metals is unusually light and prices are nominal.

Prices, per lb., in carload lots: Lake copper, 13c.; tin, 69c.; lead, 6.35c.; zinc, 6.35c.; in less-than-carload lots, antimony, 14c. On old metals we quote copper wire, crucible shapes and copper clips, 9.75c.; copper bottoms, 8.75c.; red brass, 8.75c.; yellow brass, 7c.; lead pipe, 4.75c.; zinc, 3.50c.; pewter, No. 1, 34c.; tin foil, 43.50c.; block tin, 52c.; aluminum, 14c.; all being dealers' prices for less-than-carload lots.

Mechanical Puddling Affects Negotiations Over Wage Question

YOUNGSTOWN, June 11.—Another conference will be called in the near future, at either Pittsburgh or Cleveland, between the Western Bar Iron Association and the Amalgamated Association of Iron, Steel and Tin Workers, to negotiate further a new wage scale and working agreement for the 12 months beginning June 30. Recent negotiations at Atlantic City terminated in disagreement, manufacturers resisting the wage demands of the Amalgamated association. An important consideration in the discussions was the introduction of mechanical puddling processes, replacing hand-puddling, such as the A. M. Byers Co., Pittsburgh, has installed at its plant in North Warren, Trumbull County, Ohio.

Initial experiments with the Ashton process by this company, conducted last week at Warren, proved successful, and except for a few unimportant mechanical changes, the plan is reported to be ready for commercial production. At the start, it is unlikely the Byers company will supply more than the skelp requirements for its tube mills at Pittsburgh. Later, however, it is the company's intention to diversify the manufacture of wrought iron products by installing finishing capacity at the Warren property.

In this district, the successful application of this process and the development of the high-speed rolling of stripsheets are regarded as among the most far-reaching mechanical advances made by the industry since the perfection of the Bessemer process of steel-making.

Schofield Co. Observes Seventy-fifth Anniversary

The J. S. Schofield's Sons Co., Macon, Ga., is celebrating this month the seventy-fifth anniversary of its founding. Established by John Shepley Schofield for the manufacture of cotton presses, the company has gradually expanded its products to include machinery of many types, particularly stationary engines, and has furnished power equipment for mills throughout the Southern States. The Macon Telegraph issued a special supplement, in recognition of the anniversary of June 1, which is replete with information about the company and its history.

The Truscon Steel Co. is moving its Chicago offices from 165 East Erie Street to 228 North LaSalle Street.

Old Metals, Per Lb., New York

The buying prices represent what large dealers are paying for miscellaneous lots from the smaller accumulators, and the selling prices are those charged consumers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, heavy crucible	11.00c.	12.25c.
Copper, heavy and wire	10.75c.	11.75c.
Copper, light and bottoms	9.25c.	10.50c.
Brass, heavy	7.00c.	8.50c.
Brass, light	5.50c.	7.00c.
Heavy machine composition	8.75c.	10.125c.
No. 1 yellow brass turnings	7.50c.	8.25c.
No. 1 red brass or composition turnings	8.00c.	9.00c.
Lead, heavy	5.00c.	5.625c.
Lead, tea	4.00c.	4.50c.
Zinc	4.00c.	4.25c.
Sheet aluminum	14.00c.	16.00c.
Cast aluminum	14.00c.	16.00c.

REINFORCING STEEL

Lettings for the Week About 3400 Tons and New Projects Total 7500 Tons

Awards of concrete reinforcing steel for the week, as reported to THE IRON AGE, were about 3400 tons, while inquiries totaled about 7500 tons, including 3000 tons for a mail order warehouse in St. Paul, Minn. Awards follow:

PROVIDENCE, R. I., 100 tons, church and school addition, to Truscon Steel Co.
ALBANY, N. Y., 150 tons, State roads, to Truscon Steel Co.
WESTCHESTER COUNTY, N. Y., 185 tons of foreign steel, culvert and road work, from Suburban Engineering Co., general contractor, to Otto Wolff & Co., New York.
NEW YORK, 225 tons, foundations for Bloomingdale warehouse, to Jones & Laughlin Steel Corporation.
BUFFALO, 330 tons, commercial building for A. Victor & Co., from John W. Cowper Co., Inc., general contractor, to Buffalo Steel Co.
DIXMONT, Pa., 100 tons, filtration plant, to Carlem Engineering Co.
PEKIN, ILL., 500 tons, power plant, to Jones & Laughlin Steel Co.
GLENCOE, ILL., 180 tons, filtration plant, to Concrete Engineering Co.
CHICAGO, 550 tons, building at 333 North Michigan Avenue, to an unnamed bidder.
CHICAGO, 160 tons of rail steel, bus terminal, to Inland Steel Co.
CHICAGO, 100 tons, Randall apartment building, to Concrete Engineering Co.
CHICAGO, 200 tons, Crawford Avenue power station addition, to an unnamed bidder.
CHICAGO, 133 tons, North side garage, to Barton Spiderweb System.
CHICAGO, 300 tons of rail steel, warehouse, to Olney J. Dean & Co.
ALTON, ILL., 225 tons, Alton-Bellefontaine bridges across Mississippi and Missouri Rivers, to Laclede Steel Co.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

BOSTON, 350 tons, bridge, Dorchester Bay.
CAMBRIDGE, MASS., 300 tons, aeronautical laboratory, Massachusetts Institute of Technology.
BROOKLYN, 200 tons, A. E. Laboratories building.
RYE, N. Y., 100 tons, building for New York Telephone Co.
FAR ROCKAWAY, N. Y., 100 tons, high school.
LAURELTON, N. Y., 125 tons, building for New York Telephone Co.
GARY, IND., tonnage not stated, bank building; R. C. Wieboldt & Co., general contractors.
INDIANAPOLIS, 350 tons, building at Butler University; Hegeman-Harris Co., general contractor.
CHICAGO, 195 tons, bottle washing plant; Richard Grieser, architect.
ST. PAUL, MINN., 3000 tons, building for Sears, Roebuck & Co.; B-W Construction Co., Chicago, general contractor.
ST. LOUIS, 250 tons, metropolitan police headquarters building.
SAN CARLOS, ARIZ., 2500 tons, Coolidge dam, United States Government reclamation project; bids, July 19.

PERSONAL

Benjamin W. Winship, superintendent coke ovens Bethlehem Steel Co., Steelton, Pa., who recently was elected vice-president of the Eastern States Blast Furnace and Coke Oven Association, was graduated from Drake University, Des Moines, Iowa, in 1906. He taught school for about five years and then entered the coke department of the Illinois Steel Co., Joliet, as a chemist. In 1914 he went with the Maryland Steel Co., Sparrows Point, as assistant superintendent of coke ovens and assumed his present position Nov. 1, 1916. For a brief period in 1916 he was superintendent Allegheny By-Product Coke Corporation, Glassport, Pa.



B. W. WINSHIP

Prof. Frank C. Whitmore, head of the Department of Chemistry, Northwestern University, Evanston, Ill., has been appointed a member of the faculty of the new Institute of Chemistry founded by the American Chemical Society.

Capt. W. E. McKay has been made president of the New England Fuel & Transportation Co., Boston, to succeed Robert Grant, deceased. The company controls the New England Coal & Coke Co., and both companies in turn are owned by the Massachusetts Gas Co.

George N. Jeppson, works manager and a director of the Norton Co., Worcester, Mass., has been elected president of the Worcester Airport, Inc. The Worcester Airport, Inc., will maintain an airport at Brigham Hill, near Grafton, Mass. The project has the backing of numerous people identified with the Worcester metal working industry.

David W. Wood, former head of the Wood Tilted Turret Lathe Co., has been appointed receiver for the Crawford & McCrimmon Foundry & Machine Co., Brazil, Ind., succeeding John M. Rawley.

J. A. Nichols has resigned as steel plant superintendent of the Corrigan, McKinney Steel Co., Cleveland.

E. E. Caswell, who has represented the Union Twist Drill Co. through central New York State for several years, has been appointed manager of the company's Chicago store at 11 South Clinton Street.

Charles E. Skinner, assistant director of engineering Westinghouse Electric & Mfg. Co., East Pittsburgh, and chairman of the American Engineering Standards Committee, had the honorary degree of Doctor of Science conferred upon him by Ohio University, Athens, Ohio, at the 112th commencement exercises of that school on June 7.

R. P. Shimmin has been appointed assistant to the president and the chairman of the Link-Belt Co., 910 South Michigan Avenue, Chicago. Frank B. Caldwell has been appointed sales manager for the company, and will have supervision over all sales activities in the western division. His headquarters will be at the Chicago plant office, 300 West Pershing Road.

Col. Charles A. Lindbergh was made an honorary life member of the American Association of Engineers at the thirteenth annual convention held at Tulsa, Okla., during the week of June 6. Congratulations of

the association were cabled to Clarence D. Chamberlin. Miss M. E. McIver, acting secretary of the association, was the only one before Col. Lindbergh to be honored with a life membership.

William G. Wall, consulting engineer, Indianapolis, and at present vice-president of the Society of Automotive Engineers, was nominated for president to serve for the year 1928, at the semi-annual meeting of the society held recently at French Lick, Ind. The election of officers for next year does not occur until the annual dinner to be held in New York next January.

Bruno V. E. Nordberg, executive engineer Nordberg Mfg. Co., Milwaukee, has been appointed a member of the Milwaukee Sewerage Commission, which is completing a \$25,000,000 sewage disposal plant. Mr. Nordberg fills the vacancy caused by the appointment of Robert Cramer as chief engineer of the commission, to succeed T. Chalkley Hatton. Mr. Cramer served as a commissioner for four years.

Valentine Fina, formerly president and general manager Clum Mfg. Co., maker of automotive electrical devices, Milwaukee, has joined the Milwaukee Valve Co., 139 Burrell Street, Milwaukee, as vice-president and general works manager.

Thomas Towne has been appointed general sales manager of the Fitzsimons Co., Youngstown, manufacturer of cold finished steel bars and shafting. Mr. Towne for several years has been Eastern sales manager of the company with headquarters in New York and was with the Union Drawn Steel Co., Beaver Falls, Pa., for a number of years prior to that.

William K. Stamets has resigned as vice-president and director of the Wappat Gear Works, Pittsburgh. He was one of the founders of the company.

George M. Galt has been appointed eastern sales representative for the Avey Drilling Machine Co., Cincinnati. He will act as direct factory representative, working with Henry Prentiss & Co., New York, in their territory.

Carl M. Beattie has been elected president of the Jewell Steel & Malleable Co., Buffalo. He was made secretary in 1912, and vice-president in 1926. He entered the foundry business at Troy, N. Y., in 1890, and came to Buffalo in 1911.

H. M. Bush, general sales agent American Smelting & Refining Co., 120 Broadway, New York, returned on the Leviathan, June 6, from a two months' business trip to Europe.

Warren M. Heim has been appointed general manager of sales Oliver Iron & Steel Corporation, Pittsburgh, succeeding E. Theodore Sproull, who resigned recently to become commissioner of the Cold-Rolled Strip Steel Institute. Mr. Heim has been manager of the pole line material division since early in the year, when he joined the company following a connection of several years with Hubbard & Co., Pittsburgh.

J. V. N. Dorr, president of the Dorr Co., Inc., Park-Lexington Building, New York, in recognition of his contributions to metallurgical and chemical advance, was given the degree of Doctor of Science by Rutgers University, New Brunswick, N. J., at its commencement on June 11.

A. E. Macdonald, assistant manager Crane Co., Bridgeport, Conn., sailed on the Leviathan, June 11, for a month's vacation trip to Europe.

A new course in heat engineering, planned to meet an increasing demand for engineers trained in conservation of fuel, is to be offered at the Carnegie Institute of Technology next year. The new course, it is announced, will be offered as an option in the Department of Mechanical Engineering and will be conducted under the direction of Prof. W. Trinks, head of the department, and a national authority on furnace, combustion and fuel technology problems.

OBITUARY

WALTER H. CLINGERMAN, president H. C. Frick Coke Co., Pittsburgh, died on June 13 at a hospital in that city following an operation for appendicitis. He was born in 1868, and began his career as an apprentice in the shops of the Pennsylvania railroad at Altoona, Pa., in 1885. Four years later he was transferred to the office of the superintendent of motive power as a draftsman in charge of construction work. In 1895 he was given a leave of absence to superintend the construction of car shops for the H. C. Frick Coke Co. and put its car repairs on a piece work basis. He returned to the railroad in 1896, but came back to the coke company the following year to become general foreman of its Everson car shops. In 1898 he was appointed assistant general superintendent of the company, and was made general superintendent in 1904. He became president Jan. 18, 1915, following the death of Thomas F. Lynch.



W. H. CLINGERMAN

VICTOR LENHER, for 20 years professor of chemistry at the University of Wisconsin, Madison, and nationally known for his research in selenium, died at the Wisconsin General Hospital on June 13, following an illness of six months which was generally admitted to have been contracted from his intensive scientific work. He was born at Belmond, Iowa, in 1873, and was graduated from the University of Pennsylvania. He served on the faculties of the University of California and Columbia University before going to Wisconsin in 1900. For three years he was chairman of the committee on uses of selenium and tellurium of the National Research Council and was a member of many scientific associations throughout the country.

CHARLES RANDOLPH WOOD, who for many years has been associated with R. D. Wood & Co., Philadelphia, manufacturer of cast iron pipe, died suddenly in Chicago on June 8, while attending a convention of the American Water Works Association. He was born in 1871, the son of Edward Randolph Wood, then a member of the firm of R. D. Wood & Co. Mr. Wood received his education at Haverford College. He was first associated with his father in the manufacture of glass at Millville and Malaga, N. J. Subsequently he entered the employ of R. D. Wood & Co., and after a period of training at the shops, he was transferred to the Philadelphia office. At the outbreak of the Spanish-American War, he entered the service as a paymaster in the Navy. Upon the conclusion of the war, he engaged in newspaper work, returning later to R. D. Wood & Co. At the time of his death he was manager of their hydrant and valve sales department.

Two patents of the Celite Products Co., Los Angeles, were upheld and infringement enjoined by the terms of a decree issued May 13 in Los Angeles by the United States District Court for the southern district of California. One patent pertains to a molded diatomaceous insulating brick known as Sil-O-Cel C-22. The other pertains to a composition consisting of a calcined diatomaceous aggregate known as Sil-O-Cel C-3 and a binder. This binder is often Portland cement.

American Machinery Exports to Germany Gain—Imports Also Rise

German imports of American metal-working machinery have been increasing in recent years, although they are still only about one-third of what they were before the war, according to Theodore Pilger, trade commissioner, United States bureau of foreign and domestic commerce, Berlin, Germany. Of total imports of 2683 metric tons in 1926, 1642 tons, or 61 per cent, came from the United States. In 1925 the American percentage was 58; in 1924, 24.5, and in 1913, 65.

The outlook for better business in Germany in 1927 than in 1926 is described as promising by Mr. Pilger. In January, 1927, imports of metal-working machines from the United States totaled 117 tons, and in February they increased to 189 tons. The monthly average in 1926 was 137 tons.

The difficulty of establishing satisfactory dealer relations in Germany offers probably the greatest obstacle to the expansion of American machinery trade with that country, according to Mr. Pilger. The number of really good dealers is too small to take care of the American manufacturers who should be active in that market. An adequate educational campaign is essential, he says, and this cannot be carried out through sales bulletins and catalogs. The best method is the placing of at least one reliable and trained engineering salesman in the field, together with a well-versed mechanic to erect and service machines sold. The competition offered by German producers and German copies of American machinery makes it necessary for the American manufacturer to go after the ultimate purchaser with much greater vigor than before the war. There is no doubt, according to Mr. Pilger, that despite all adverse conditions, Germany can be brought back as one of the profitable outlets for American metal-working machinery.

Germany's exports of 60,600 metric tons of metal-working machinery in 1926 have been exceeded only twice—in 1913, an unusually prosperous year, and in 1920, when the currency inflation led to large foreign sales. The value of 1926 exports, however, amounted to 94,000,000 marks, or 15 per cent more than in any previous year. German export statistics do not include "reparation deliveries in kind."

Machine tools constitute 90 per cent of the metal-working machinery shipped out of that country.

The United States is now the second best market for German exporters of metal-working machinery. American imports of German machinery in 1926 totaled 6742 metric tons, or 11.1 per cent of the total exports from that country, as compared with 4.8 per cent in 1925 and 1.75 per cent in 1913.

Invites Comment on Standard for Shell End Mills

The first report on the proposed American standard for shell end mills and cutter clamping screw has been completed by subcommittee No. 5 on the standardization of milling cutters under the sponsorship for the standardization of small tools and machine tool elements. Page proofs of the standard are being distributed for criticism and comment.

The sponsorship for the standardization of small tools and machine tool elements was assigned by the American Engineering Standards Committee in March, 1920, to the National Machine Tool Builders Association and the American Society of Mechanical Engineers. Later the Society of Automotive Engineers joined in this sponsorship. Copies of the proposed standard may be had from T. R. Jones, A.S.M.E., 29 West Thirty-ninth Street, New York.

An order placing the Struthers Furnace Co., Struthers, Ohio, in bankruptcy was issued in the Federal Court in Cleveland recently, but was later set aside on petition of Hugh Grant, who has been receiver of the plant for some time. The bankruptcy petition was filed by Albert Grossman, secretary of the company, who listed the assets at \$4,700,000 and liabilities at \$3,484,731.

Exceeds Ton of Sheets Per Minute

(Concluded from page 1737)

is in this mill that sheets down to No. 20 gage in thickness and 41 in. in width are rolled.

At the end of the runout table following the last stand is a shear to cut the sheets into the desired length. Material is delivered by crane to two rotary side trimmers and two cutoff shears for end shearing, the trimmers and shears being arranged in tandem.

Placed upon a conveyor, the sheets pass through a leveling machine and then through a stitching machine. In the latter the rear end of one sheet is stitched to the front end of the next sheet, five stitches being taken in the overlapped part, which measures about 1½ in. The stitching machines are on rollers, so that if one needs repair another can be moved into the proper position to replace it. The result of this operation is a continuous ribbon of sheets ready for further processing.

From the stitching machine the ribbon of sheets is conveyed on motor-driven rolls through the annealing furnaces. Provision for taking up and relieving slack in the space between the stitching machine and annealing furnaces has been made by a series of loops. This arrangement provides an extra quantity of material, so that it will be available for movement into the annealing furnaces.

The annealing furnaces are equipped with pyrometers, and the atmosphere, temperature and speed of the ribbon are closely controlled. From the furnace the sheets go through a cooling hood, operated to keep the outer air from entering and causing oxidation. However, in order to remove whatever oxidation has accumulated in the course of the journey, the sheets pass from the cooling hood into pickling vats, of which there are nine. Whether the sheets pass through the entire nine depends upon the requirement for properly conditioning the sheets. The vats are vertical cylindrical affairs, built of wood, lead-lined, and the ribbon of sheets is looped into the vats from rolls located above each vat.

After leaving the pickling vats provision again is made to take up and relieve slack by a series of long loops before the ribbon passes to the shear which cuts out the stitches, and then the sheets are piled automatically beside the shear.

From this point the sheets are transported by crane to the cold-rolled department, which occupies two parallel runways 75 ft. wide and 360 ft. long. Here there are eight trains of rolls of from two to five stands each, each mill of 26 x 56-in. rolls and operating at approximately 30 r.p.m. Five of the trains are driven by Westinghouse 300-hp. induction motors of a speed of 585 r.p.m., and three by 400-hp. induction motors, all of the motors being equipped with Falk single reduction drives.

The sheet mill has also three continuous box annealing furnaces, each of which has a capacity for twelve 15-ft. cars containing about 30,000 lb. of sheets each. The furnaces are served from a transfer car traveling in a pit extending across the fronts of the furnaces and carrying a specially designed charging machine built by the Morgan Engineering Co.

While the procedure varies somewhat according to conditions incident to every order, the usual course is to cold-roll sheets to obtain a better finished surface, then box anneal them, and finally put them through another cold-rolling operation for proper tempering. In the final operation the sheets are given from one to four passes, the number depending upon the required physical draw.

In the inspection and shipping department all sheets are inspected and stamped with the Armco trademark. Elwell-Parker lift trucks of 10 tons capacity each are employed to load the sheets on railroad freight cars. Two switching tracks from the main line of the Chesapeake & Ohio Railroad afford facilities for a platform capacity of 35 freight cars.

For shearing all material of heavy gages a large shear is housed in a "shear building," which is served by a 15-ton Morgan crane. Of uncommon interest is the fact that the crane has no cab depending from one side, the crane and the shear being controlled from

a pulpit stand adjacent to the shear in the middle of the building.

In the galvanizing department there are four pots and one Mesta low-type air counter-balanced pickler. In addition, there is a corrugating machine which will take No. 8 gage sheets 13 ft. long.

Field control of the sheet mill is maintained through a laboratory adjoining the cold-rolled department, where tests are made to ascertain whether the material in process meets all of the physical requirements specified by the purchaser.

Simplification of the handling of and caring for small tools has been accomplished by the establishment of a central store room and branch store rooms in various parts of the plant. Whenever a workman is in need of a tool or other equipment he goes to his foreman, who fills out a requisition for it. In this way each foreman knows what his men have in their possession and is partially responsible for the return of the tools in good condition.

Bulletin boards, on which are posted the number of the order going through at the moment and the name of the customer receiving the material, have been erected in the jobbing and sheet mills. In this way the rollers and their assistants are apprised of the particular job on which they are working, more personal interest on the part of the men thereby being aroused.

The blooming, bar plate and sheet jobbing mills are on two 10-hr. turns. This policy gives an opportunity for operating the mills for 10 hr. and then inspecting and "maintaining" them for a period of 2 hr. The sheet mill is on three 8-hr. turns.

After being in operation for one month the Ashland plant was turning out 350 tons of sheets per day; today it is capable of producing 1400 tons per day, or approaching 500,000 tons annually. In fact, the actual capacity has not been established, because improvements here and there appear to be making possible the manufacture of a constantly increasing tonnage of sheets.

Rapid growth of the automobile industry created the problem of producing a quality sheet for automobile bodies which could be drawn into intricate shapes without damage to the surface. In the search for sheets with a more highly finished surface the fact was brought out that better surfaced rolls were essential. The turned roll was found to be too irregular and not sufficiently accurate, and the Armco practice is to grind all rolls.

Operation of the Ashland plant over a period of three years has brought to light a number of practical benefits. The saving of hand labor is obvious, since almost all of the processes performed by hand in the conventional type of sheet mill are executed here mechanically. The greatly increased production is found to lower substantially the cost of power per ton of sheets. Wastage is put at less than 15 per cent. On top of all this it is emphasized that the adoption of mechanical processing has not interfered with maintaining quality. Rather it is urged that the revolutionary development at Ashland is an answer to the challenge of sheet users for the manufacture in large quantities of sheets of the highest possible finish. Quality as well as quantity has been the demand, and the latter could not be marketed without the former, so the point is now made that quality is actually dependent upon tonnage in that uniformity of gage and surface call for continuity of operation.

Establish Mileage Scale on Rails and Concrete Bars from Huntington, W. Va.

WASHINGTON, June 14.—Passing upon a complaint of the West Virginia Rail Co., Huntington, W. Va., the Interstate Commerce Commission in a decision made public last week held that rates on iron and steel rails and concrete reinforcing bars in carloads from Huntington to points in Kentucky, Tennessee and Virginia are unreasonable, and established a mileage scale governing new rates, effective on or before July 28. Reparation also was awarded, but the allegation of undue prejudice was dismissed. The commission said that fourth section violations will be removed by establishment of the rates which were provided.

European Export Trade Quiet

Prices Fairly Firm—Germany Negotiating 1928 Iron Ore Requirements—German Hoop Syndicate First to Include All Makers

(By Cable)

LONDON, ENGLAND, June 13.

DOMESTIC and export demand for pig iron is improving, but sales are still confined to small parcels. An Italian interest has purchased 3000 tons of hematite and some Welsh hematite has been sold to the United States.

There are now 42 Cleveland furnaces in blast. The Whitehaven Hematite Iron & Steel Co., Ltd., in Cumberland has damped one West Coast furnace, leaving 14 in blast in that district. In Scotland there are 35 blast furnaces active. Foreign ore is quiet with British users, but Germany has displayed an interest in French, North African and Swedish grades and in some cases 1928 requirements have been covered.

Finished steel is dull and shape prices have weakened to within 2s. 6d. per ton (60c.) of the fixed minimum price. Makers need orders, particularly for

plates, but consumers are expecting still lower prices. Bolckow, Vaughan & Co., Middlesbrough, have secured 10,000 tons of rails from the Buenos Ayres & Great Southern Railway.

More tin plate mills have been closed and prices are steady at about 19s. (\$4.60) per base box, f.o.b. works port. As few makers are accepting less than this, demand is consequently slightly improved and better exports sales have been effected. The general outlook, however, is at present not bright.

Galvanized sheets are quiet and prices easier, as some makers are in need of specifications against current contracts and are seeking early shipment orders. Black sheets are moderately active in small lots, but the total tonnage moving is not large.

Continental markets are quiet and prices easy as some mills are in need of orders. There were 55 Belgian furnaces in blast June 1.

QUIET MARKET IN FRANCE

Prices Fairly Firm But Sales Small—European Rod Makers Near Agreement

PARIS, FRANCE, June 3.—The upward movement of prices and general strength of the market that appeared about the middle of May, causing increases in export quotations of 1 to 2 shillings per ton, has ceased, and although there have been no price reductions, business is slack. Most of this activity was confined to the export market, domestic business being unaffected except by a slightly firmer attitude on the part of sellers. Producers point out that they are in a difficult situation. To make any further reductions in quotations without actual loss, a lower wage level is necessary. Wage decreases, however, are impossible at present, as the cost of living is advancing.

Pig Iron.—Production of foundry iron declined in April as compared with March, totaling only 133,181 metric

tons, while the March output was 147,579 tons. The total production of all kinds of pig iron in April was 773,914 tons, compared with 801,020 tons in March. This is attributed to the gradually declining demand in the domestic and export markets that has been evident for several months. On May 31, there were 146 furnaces in blast, 36 ready to blow in, and 34 under repair. In the past week, demand has improved slightly and the tonnage placed at the disposal of domestic consumers has been almost entirely sold. The base price for No. 3 P.L. has been decreased to 460 fr. (\$18) per metric ton, f.o.b. furnace. Last week the producers of phosphoric pig iron discussed the question of quotas in the pig iron entente with Belgium and Luxemburg and there seems to be a possibility, with the new viewpoints that appeared at this meeting, that the entente may be continued. Export trade continues quiet as a result of the high production rates and large stocks available not only in France but in Germany and Britain. British producers have sold No. 3 G.M.B. at £3 10s. (\$16.97) per ton and a Luxemburg furnace with about 30,000 tons of iron in

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at \$4.85 per £ as follows:

Durham coke, del'd.	£1 1½s.		\$5.21	
Bilbao Rubio oref..	1 2	to £1 2½s.	5.33	to \$5.46
Cleveland No. 1 fdy.	3 12½		17.57*	
Cleveland No. 3 fdy.	3 10		16.97*	
Cleveland No. 4 fdy.	3 9		16.73*	
Cleveland No. 4 forge	3 8½		16.61*	
Cleveland basic	3 15	to 3 15½	18.18	to 18.30
East Coast mixed....	3 18		18.90	
East Coast hematite	3 18½		19.03	
Rails, 60 lb. and up.	7 15	to 8 5	37.58	to 40.01
Billets	7 5	to 7 10	35.16	to 36.37
Ferromanganese	12 0		58.20	
Ferromanganese (export)	11 15		56.98	
Sheet and tin plate bars, Welsh	6 5		30.31	
Tin plate, base box..	0 19	to 0 19½	4.60	to 4.66
Black sheets, Japanese specifications.	14 0	to 14 5	67.90	to 69.11
C. per Lb.				
Ship plates	7 12½	to 8 0	1.65	to 1.73
Boiler plates	10 10	to 11 0	2.27	to 2.38
Tees	8 2½	to 8 12½	1.75	to 1.87
Channels	7 7½	to 7 17½	1.60	to 1.70
Beams	7 2½	to 7 12½	1.54	to 1.65
Round bars, ¾ to 3 in.	8 0	to 8 10	1.73	to 1.84
Steel hoops	10 10	to 11 0	2.28	to 2.39
Black sheets, 24 gage	11 0		2.39	
Galv. sheets, 24 gage	14 10		3.14	
Cold rolled steel strip, 20 gage, nom.	14 0		3.03	

*Export price, 6d. (12c.) per ton higher.

†Ex-ship, Tees, nominal.

Continental Prices, All F.O.B. Channel Ports (Per Metric Ton)

Foundry pig iron: (a)				
Belgium	£3 3s.	to £3 4s.	\$15.28	to \$15.52
France	3 3	to 3 4	15.28	to 15.52
Luxemburg	3 3	to 3 4	15.28	to 15.52
Basic pig iron:				
Belgium	3 2½	to 3 3	15.15	to 15.28
France	3 2½	to 3 3	15.15	to 15.28
Luxemburg	3 2½	to 3 3	15.15	to 15.28
Coke	0 18		4.37	
Billets:				
Belgium	4 10	to 4 11	21.82	to 22.06
France	4 10	to 4 11	21.82	to 22.06
Merchant bars:				
Belgium	4 17	to 4 17½	1.07	to 1.08
France	4 17	to 4 17½	1.07	to 1.08
Luxemburg	4 17	to 4 17½	1.07	to 1.08
Joists (beams):				
Belgium	4 17½	to 4 18	1.08	to 1.09
France	4 17½	to 4 18	1.08	to 1.09
Luxemburg	4 17½	to 4 18	1.08	to 1.09
Angles:				
Belgium	4 17		1.07	
½-in. plates:				
Belgium (nominal)	6 7		1.29	
Germany (nominal)	6 7		1.39	
¾-in. ship plates:				
Belgium	5 17		1.28	
Luxemburg	5 17		1.28	
Sheets, heavy:				
Belgium	6 2		1.34	
Germany	6 2		1.34	

(a) Nominal.

stock is reported to have sold pig iron to Italy at £2 19s. (\$14.30) per ton and to Great Britain at £3 12s. 6d. (\$17.57) per ton. Lower export quotations on hematite iron are followed by German exporters and the competition for foreign business is keen.

Ferroalloys.—The international syndicate has been formed but French producers are not members. The syndicate price for ferrosilicon, 75 per cent, is £19 (\$92.15) per metric ton, c.i.f. French port, while the quotation of the French comptoir is 2550 to 2650 fr. (\$99.83 to \$103.75) per ton, delivered. In ferromanganese, the Norwegian interest is quoting £13 to £15 (\$63.05 to \$72.75) per ton, delivered, on orders for 100 tons or more. A stock of 76 to 80 per cent ferromanganese is being carried at Thionville by the Norwegian interest. Quotations of French ferromanganese producers are still about 2100 fr. (\$82.22) per metric ton, delivered.

Semi-Finished Material.—For export blooms have been sold at £4 3s. and £4 7s. (\$20.12 to \$21.10) per metric ton, depending upon the size and tonnage. Billets have been quoted at £4 12s. and £4 19s. (\$22.30 to \$24.00) per metric ton and slabs at £4 14s. to £4 15s. (\$22.79 to \$23.03) per metric ton. All these quotations are higher than the domestic market, except that they are f.o.b. Antwerp, instead of f.o.b. mill.

Finished Material.—The total ingot production for April was 668,176 metric tons compared with 691,411 tons in March. Of the total steel output in April only 185,281 tons was open-hearth, the rest being basic Bessemer, electric and crucible. The market on rolled products is quiet, but a slight increase in domestic purchasing is expected before long, as consumers' stocks are believed to be low. Beams are quoted at £4 12s. to £4 14s. (\$22.30 to \$22.79) per metric ton, f.o.b. Antwerp, which is 2 to 3 fr. (8c. to 12c.) per ton higher than the export price about two weeks ago. At the meeting last week for the purpose of negotiating a new wire rod entente of German, French, Belgian and Luxemburg producers, it was tentatively agreed that the quotas could be settled at 1,040,000 tons per year for Germany, 400,000 tons for France, 270,000 tons for Belgium and 120,000 tons for Luxemburg. It was suggested that the export price could be established at £5 7s. 6d. (\$26.07) per ton for contracts of 1000 tons or more and at £5 10s. (\$26.67) per ton for contracts of less than 1000 tons. Sheets continue quiet, particularly the light gages. The export price on the heavier gages is slightly firmer at £6 17s. 6d. (\$33.33) per ton, f.o.b. Antwerp.

United States Uses 35 Per Cent of World's High Grade Manganese Ores

The United States, as the largest producer of steel, uses approximately 35 per cent of the world's annual output of high grade manganese ores, but contributes only 4 per cent, based on the 1925 output. These facts are set forth in circular No. 6034, Bureau of Mines, Department of Commerce, Washington, which presents many facts regarding the world's manganese ore trade in an effort to show the dependence of this country on foreign supply. The circular is exhaustive, going into almost every phase of manganese under such subject headings as metallurgy, uses, alloys, oxidizers, consumption and production statistics, sources of supply, tariffs, marketing methods and a buyers' directory. Copies of the circular may be obtained from the Department of Commerce.

Germany May Buy Half of Ore in Sweden

STOCKHOLM, SWEDEN, May 27.—According to the *Svenska Morgenposten*, of May 26, the German Pig Iron Association has offered to contract with the Swedish ore mines for 50 per cent of the German requirements over the next six years. As this would involve about 10,000,000 tons a year, it is believed that even though there is no actual contract concluded, special facilities for furnishing the German requirements will be offered.

EXPORT BUSINESS QUIET

Chinese Tin Plate Needs Covered—America to Supply Some Rails for Japan

NEW YORK, June 14.—Export business with the Far East is still limited to small purchases. Even tin plate waste for China is in little demand, a condition partly explained by the report that a large Japanese export house, which ships sizable tonnages of this material to Japan, disposed of a number of lots to Chinese merchants at the time of the recent Japanese financial difficulty. Japanese merchants are still purchasing but little material in the United States. British and German sheet prices continue lower than the offers of mills in the United States and tin plate inquiries are generally for small lots. In the past fortnight, one Japanese house in New York has closed two lots of 1000 boxes each of tin plate for Japanese concerns.

Rail business is also confined to small tonnages, principally by cities. Kobe municipality will open bids June 15 on about 770 tons of girder and high T-rails and several switches and crossovers. This is the second opening on this list, purchase having been postponed after the first opening in April. The list of girder and high T-rails for Tokio municipality, bids on which were opened June 4 and 5, was divided between the United States and a European maker. The high T-rails went to Europe and the girder rails are understood to have gone to the leading interest here, being placed by the Asano Bussan Co., New York.

Importers Report Activity

Importers of European steel in New York are booking a fair volume of small orders and have outstanding quotations on several sizable tonnages, particularly of reinforcing bars. One lot, which has been quoted on by several importers of steel, calls for about 1700 tons of bars of various sizes, but it is being inquired for by a broker and is believed to consist of an accumulation of small orders. Prices continue fairly firm at about 1.75c. per lb., base, for bars of Thomas grade with reinforcing bars at about 1.80c. per lb., and open-hearth quality about 1.85c. per lb., base. On large lots, however, these prices have been shaded considerably.

European Wire Netting Cartel Dissolved

HAMBURG, GERMANY, May 29.—The International Wire Netting Makers' Syndicate, which includes British, French, Belgian and German manufacturers, has been dissolved, effective Oct. 1. Dissolution was caused by the fact that the Continental members, according to agreement, had been giving special consideration to British buyers, but were dissatisfied with the results from other countries in which British manufacturers had agreed to restrict their trade. Further, there were too many outsiders on the Continent. Another difficulty was the fact that Austria and Czechoslovakia, which have a rather large capacity, were unwilling to join the syndicate. As a result of the collapse of the international syndicate, intense competition is expected.

German Hoop Syndicate All Inclusive

HAMBURG, GERMANY, May 29.—The three hoop producers, who were not members of the German Hoop Iron Association, have finally joined, eliminating all outside competition. This is the first association in Germany to include all producers in its field and, in consequence, its future conduct and effect on the market is being viewed with interest.

According to the German consul at Teheran, Persia, the Persian Government plans the erection of a blast furnace and rolling mill in the fall of 1928. The proposed steel works will be financed by the entire revenue of the government monopoly on sugar and tea. The expected capacity per day is 300 tons of pig iron, 320 tons of steel ingots and 270 tons of finished products.

Machinery Markets and News of the Works

SOME RAILROAD BUYING

Machine Tool Business Otherwise Is Extremely Quiet

New York Contractor Issues Inquiry for About 15 Machines for Medical College

A FEW railroads have awarded orders for machine tools or have issued inquiries, but otherwise the demand shows further signs of slackening. The Sante Fe Railroad is placing a number of orders in Chicago and the Southern Pacific has ordered three lathes. The New York Central is in the market for five lathes, the Missouri Pacific has issued an inquiry which includes three turret lathes, the Chicago & North Western is

asking for prices on two machines and the Wabash may buy an axle lathe and a heavy-duty engine lathe. A railroad in China has inquired in the Cincinnati market for seven lathes.

Oil development companies in South America have ordered tools within the past week or two. A South American company is now in the market for 10 lathes.

The Lidgerwood Mfg. Co. has bought about eight machines for a new plant at Elizabeth, N. J.

Fresh inquiry appears to be at about the lowest point of the year in nearly all markets. New England reports indicate a revival of interest in used machines, such inquiries exceeding in number those for new machines.

An inquiry for about 15 tools of various types has been issued by Marc Eidlitz & Son, New York contractors, for a machine shop for the College of Physicians and Surgeons, New York.

New York

NEW YORK, June 14.

MACHINE tool buying continues at a moderate pace. Inquiries are fewer in number, indicating perhaps that, with the approach of summer, manufacturers are holding their plans somewhat in abeyance. The Lidgerwood Mfg. Co., which is erecting a new shop at Elizabeth, N. J., for the manufacture of hoisting engines, has bought about eight tools. The largest inquiry before the trade is from Marc Eidlitz & Son, 41 East Forty-second Street, general contractors, who are building a new shop for the College of Physicians and Surgeons at Broadway and 168th Street, New York. The list calls for numerous parts and accessories and the following machines:

- One 14-in. x 6-ft. Monarch lathe.
- One 12-in. x 6-ft. Monarch lathe.
- One No. 608 Rivett precision lathe.
- One Hisey-Wolf buffing machine.
- Two Racine hack saws.
- Two Racine band saws.
- One Crescent 38-in. band saw.
- One Blount floor grinder.
- One 14-in. Washburn sensitive drilling machine.
- One 15-in. Springfield crank shaper.
- One Van Norman duplex milling machine.
- One Gehrnich enameling oven.
- One American gas furnace.

Orders of the week include the following: A 13-in. x 30-ft. lathe from an aircraft company, a gear testing machine from a Hartford, Conn., machinery company, a 16-in. x 60-ft. lathe from a Los Angeles company, an automatic centering machine from an ignition company in Indiana, a jig borer from a tool company in Milwaukee, a 4½ x 12-in. thread milling machine from an electrical manufacturer in Indiana, a 48-in. x 24-ft. lathe from a New Jersey cast iron pipe foundry, a heavy end-driven axle lathe from a locomotive works.

Bids will soon be asked by the Mergenthaler Linotype Co., 29 Ryerson Street, Brooklyn, for a new nine-story plant to cost about \$450,000. Herman Fougner is company architect. William H. Dusenbury, 1841 Broadway, New York, is mechanical engineer.

The Diamond & Frazer Iron Works, Inc., 830 East 147th Street, New York, has engaged Morris Whinston, 116 West Thirty-ninth Street, architect, to prepare plans for a new one-story plant on site recently acquired to cost approximately \$20,000 with equipment.

The Cadillac Motor Car Co., 1881 Broadway, New York, is planning the early erection of a new multi-story service,

repair and garage building on Columbus Avenue, between Sixty-second and Sixty-third Streets, to cost more than \$350,000 with equipment. The company has disposed of its present service plant on West Sixty-seventh Street.

The Yonkers Plumbing & Supply Co., 43 Dock Street, Yonkers, N. Y., has asked bids on a general contract for a new one-story plant to cost more than \$40,000. George W. Kabitz, 410 East Tremont Street, New York, is architect.

The New York, Westchester & Boston Railway Co., 481 Morris Park Avenue, New York, has awarded a general contract to Dwight P. Robinson & Co., Inc., New York, for an addition to its two-story shop.

The Cities Service Power & Light Co., 60 Wall Street, New York, operating utility properties in Ohio, Missouri, Colorado and other States, has arranged for a preferred stock issue to total \$6,956,000, a portion of the proceeds to be used for extensions and improvements. Henry L. Doherty is president.

William Shary, 22 East Seventeenth Street, New York, architect, has filed plans for a two-story automobile service, repair and garage building, 96 x 155 ft., to cost about \$70,000 with equipment.

T. Cohn, 745 Sixty-fifth Street, Brooklyn, manufacturer of metal toys, has plans for a new two-story plant to cost close to \$65,000 with equipment. Salvati & Le Quornik, 369 Fulton Street, are architects.

Bids are being asked by the Brooklyn & Queens Screen Mfg. Co., 1576 Bushwick Avenue, Brooklyn, for a two-story plant, to cost approximately \$60,000 with equipment. Lama & Proskauer, 391 Fulton Street, are architects.

The Standard Oil Co., 26 Broadway, New York, has plans for extensions and improvements in its power house at 400 Kingsland Avenue, Brooklyn, to cost \$25,000.

The Board of Education, Paterson, N. J., contemplates the erection of a three-story addition to its vocational school on Ellison Street, 60 x 100 ft., to cost about \$50,000 exclusive of equipment.

The United States Metals Refining Co., 61 Broadway, New York, is considering a one-story addition to its copper works at Carteret, N. J., to cost more than \$30,000.

The Radio Electric Clock Corporation, 50 Church Street, New York, recently organized to manufacture special clock mechanisms to be controlled for accuracy in operation by radio, has acquired property at Linden, N. J., as a site for a new plant. Plans are in progress for the initial unit, one-story, 64 x 100 ft., with extension, 40 x 100 ft., to cost about \$65,000. William Meyer, Jr., and Robert E. Genetz, 711 Bergenline Avenue, West New York, N. J., are architects. The new company is headed by Col. Frederick L. Devereaux, president Bell Security Co., a subsidiary of the American Telephone & Telegraph Co., who will be

president, and Frederick L. Burnham, secretary and treasurer.

The Board of Commissioners, Montclair, N. J., is planning extensions in the main pumping plant of the municipal waterworks with installation of additional pumping machinery. Metcalf & Eddy, 14 Beacon Street, Boston, are consulting engineers.

The Merchants Refrigerating Co., 41 River Street, Newark, has filed plans for a new refrigerating and cold storage plant, 120 x 175 ft., to cost upward of \$275,000 with machinery. Instead of a smaller amount, previously noted. J. B. Snook, 52 Vesey Street, New York, is architect.

The Board of Education, Little Falls, N. J., is considering the installation of manual training equipment in a new junior high school to cost about \$250,000, for which plans will be drawn by F. W. Wentworth, 140 Market Street, Paterson, N. J., architect.

The K. & M. Steam Engineering Co., 94 Franklin Avenue, West Orange, N. J., has been organized to manufacture a special safety steam trap. The company is in the market for the fabricating of some of its parts, especially that type of work requiring screw machines, and is buying various materials.

The Newark Steel Drum Co. has removed its plant to Linden, N. J., where equipment for the cleaning and reconditioning of steel drums is being installed.

New England

BOSTON, June 13.

USED machine tools the past week again led new tools in this and other New England markets and, according to local dealers, fully 90 per cent of new inquiries concern used equipment. New prospects for both new and used machines want single tools only and the trade looks for no real expansion in business until August, at least.

Recent sales reported include a 4-ft. radial drill to a Hartford, Conn., manufacturer; a new 9-in. lathe to a Maine shop, a New England made turret lathe to a Boston firm, a used rotary shear to a Cambridge, Mass., company, a used milling machine to a greater Boston plant, two used No. 2 Pratt & Whitney screw machines, a 16-in. lathe, two upright drills and some fairly high priced used bench tools, all to Massachusetts shops. Approximately \$3,000 worth of wood-working machinery was sold to a Lawrence, Mass., firm whose plant was recently burned. A used universal boring machine went to Chicago. Small tools are selling better than last month.

The Agar Mfg. Co., 15 Winchester Street, Medford, Mass., paper boxes has started a one-story 150 x 300 ft. manufacturing plant for which motors and miscellaneous equipment are required. Harry M. Ramsay, 184 Boylston Street, Boston, is the architect.

Work has started on a one-story addition to the Wellesley, Mass., junior high school to house an addition to the manual training and other departments. Lockwood St. J. Towne is chairman of the building commission. Benjamin Proctor, 25 Arch Street, Boston, is architect.

The Boston & Maine Railroad, North Station, Boston, has taken out a permit to construct a one-story, 79 x 194 ft. repair shop near its present plant at Springfield, Mass., to cost without equipment \$73,000.

The J. W. Bishop Co., Worcester, Mass., has been awarded contract to erect a one-story, 106 x 160 ft. garage with a 41 x 120 ft. ell for the Worcester Consolidated Street Railway Co., work to be completed by Oct. 1. The plant will include a repair shop and inspection unit.

The plant of the Connecticut Brass & Mfg. Corporation, Waterbury, Conn., started during the World War and sold to a group of Boston and New York financiers who organized a \$3,000,000 corporation early in the war, has been sold to Schnee & Schnee, New Haven, Conn., realtors, for \$80,000. The buyers have not stated what they intend to do with the plant. About \$100,000 machinery previously was sold at private sale.

The Moore Drop Forge Mfg. Co., Springfield, Mass., has completed arrangements for the manufacture of the Morco patented two-part conveyor chain, a product of the Anthracite Chain & Engineering Co., Hazleton, Pa. The Springfield plant heretofore was largely concerned with Ford automobile parts. S. J. Benner, formerly president of the Hazleton company, will manage the chain department of the Massachusetts company. Production will begin about July 1.

The Perkins Brass Co., Porter Street, Taunton, Mass., monel metal, has started the erection of a new plant on

Ingell Street. The company took over the old Trefethen Brass Foundry about ten years ago and since then has doubled its production. Eben Perkins and his daughter, who is a graduate chemist, control the business.

The Hart & Hutchinson Co., Corbin Avenue, New Britain, Conn., manufacturer of metal lockers, etc., has awarded a general contract to William H. Allen & Co., 12 Glen Street, for a one and two-story addition, 75 x 112 ft., to cost more than \$60,000.

The Board of Works, Nashua, N. H., has filed plans for a one-story municipal machine shop, automobile service and garage building, 60 x 200 ft., with extension, 50 x 60 ft., to cost about \$65,000.

The White Laboratories, Inc., Boston, care of John J. Shay, 30 Federal Street, treasurer, recently organized by Mr. Shay and associates with a capital of \$75,000, has acquired a two-story factory at Gloucester, Mass., and will establish a new oil refining and compounding plant. John N. Penick is president.

The Aircraft Corporation of America, Inc., 109 West Fifty-seventh Street, New York, is completing plans for a new plant at Devon, Conn., with main unit, one-story, 150 x 350 ft. Hangars will also be built. The entire project is estimated to cost upward of \$85,000 with equipment.

Fire, June 7, destroyed a portion of the vocational school, New Bedford, Mass., with loss reported at \$250,000.

Parker Brothers, Inc., Salem, Mass., manufacturer of toys, games, etc., has plans for a two-story addition, to cost approximately \$50,000 with equipment.

The United States Pegwood & Shank Co., Bridge Street, Brownville, Me., is said to be arranging to rebuild the portion of its plant recently destroyed by fire, with loss of more than \$25,000 including equipment.

The American Bosch Magneto Corporation, Springfield, Mass., has closed an agreement with the Radio Corporation of America, New York, for patent rights and manufacture of radio equipment, including radio sets, parts and accessories. The company has also secured licenses for all inventions of the Radio Frequency Laboratories and the Lecktophone Corporation, including loud speakers, circuit apparatus, etc. The acquiring company plans expansion in plant facilities.

The E. Z. S. Corporation, Woonsocket, R. I., has been organized to manufacture machinery and parts. The company will not build a factory and at present is not in the market for materials.

The Foster Merriam Co., Meriden, Conn., has arranged with the Bassick Co., Bridgeport, Conn., to handle the manufacture and sale of the line of casters, formerly manufactured by the Meriden company. The Foster Merriam Co. will continue the manufacture of grey iron, brass, bronze and aluminum castings, cabinet hardware, furniture trimmings and specialties.

Chicago

CHICAGO, June 13.

INTEREST in the local machine tool market is still centered in the Santa Fe list which, although moving slowly, is affording a few orders each week. A local machine shop has purchased four milling machines and other scattered sales bring the total volume of business closed in the week to about the average of that late in May. New inquiry appears to be at the low point of the year, except in used tools, which at the moment are being rather eagerly sought, especially drill presses and large lathes. The Chicago & North Western is asking for prices on a 20-in. drill press and a power hack saw. Competition is keen and prices are not maintained in all cases.

The Argyle Cut Stone Co., 4931 North Cicero Avenue, Chicago, will build a one-story shop, 50 x 68 ft. E. Nordlie, 4825 North California Avenue, is architect.

A. S. Johnson, 705 Wright Street, LaSalle, Ill., will equip a tool manufacturing and jobbing machine shop.

The Foster Bolt & Nut Co., 6249 West Sixty-fifth Street, Clearing Industrial District, Chicago, has begun the erection of a one-story addition, 50 x 200 ft. The company recently acquired property totaling about 72,000 sq. ft. adjoining its plant for this and other units to be built later. Foltz & Co., Chicago, are architects.

Albert Kahn, Inc., Marquette Building, Detroit, architect and engineer, has plans for a new two-story automobile service, repair and garage building at Oak Park, Ill., to cost in excess of \$100,000 with equipment.

Frank O. Kehrberg, Sheldon, Iowa, is at the head of a project to construct a steam-operated power plant at Le Mars, Iowa, to cost close to \$100,000. A company will be organized to carry out the work.

The Crane Market

THE volume of new inquiry in the past week has been small, but there are a number of both overhead and locomotive crane orders that will probably be placed shortly. The 100-ton power house crane for Henry L. Doherty & Co., 50 Wall Street, New York, is still open. The Lidgerwood Mfg. Co., 96 Liberty Street, New York, which issued an inquiry for several cranes about two months ago, has asked for bids on a revised list including one 25-ton, two 10-ton and two 2-ton overhead traveling cranes for a new plant. The purchase of the Texas & Pacific Railway Co., Dallas, Tex., reported last week, consisted of a 250-ton, 85-ft. span, 8-motor, overhead crane with two 125-ton trolleys, each equipped with two 15-ton auxiliaries, purchased from the Cleveland Crane & Engineering Co., and three 15-ton electric cranes placed with a Western builder. Among locomotive crane inquiries still open are the three 25-ton, 5-ft. gage locomotive cranes for the Russian Government under inquiry by the Amtorg Trading Corporation, 165 Broadway, New York, and the two 20-ton locomotive cranes for the New York Central Railroad.

Among recent purchases are:

Breen Iron Works, Newark, N. J., two 5-ton electric traveling cranes reported purchased from the Shepard Electric Crane & Hoist Co.

New York Central Railroad, New York, two 40-ton crane trolleys for Buffalo, from an unnamed builder.

Albany Bridge & Construction Co., Albany, N. Y., a 10-ton, crawl-tread, locomotive crane from an unnamed builder.

Sinclair Oil & Gas Co., Tulsa, Okla., a 10-ton crawl-tread locomotive crane from the American Hoist & Derrick Co.

American Steel & Wire Co., Pittsburgh, two 15-ton and one 5-ton, double-hook overhead traveling cranes from the Alliance Machine Co.

Donner Steel Co., Buffalo, N. Y., a 15-ton crane and a 5-ton, double-hook overhead crane from the Alliance Machine Co.

Ford Motor Co., Detroit, two 15-ton, double-hook, elec-

tric traveling cranes, one 5-ton open-hearth charging crane and a 5-ton soaking pit crane from the Alliance Machine Co.

Youngstown Sheet & Tube Co., a 5-ton capacity bucket and trolley from the Alliance Machine Co.

Tennessee Coal, Iron & Railroad Co., Birmingham, one 50-ton and one 75-ton, electric overhead cranes from the Alliance Machine Co.

General Electric Co., Schenectady, N. Y., a 30-ton standard electric traveling crane from the Alliance Machine Co.

Farrel Foundry & Machine Co., Ansonia, Conn., one 30-ton electric overhead crane from the Alliance Machine Co.

Chicago Bridge & Iron Co., Chicago, a 15-ton electric overhead crane from the Alliance Machine Co.

Keystone Steel & Wire Co., Peoria, Ill., a 7½-ton gantry crane from the Alliance Machine Co.

Gould Coupler Co., Depew, N. Y., a 35-ton electric traveling crane from the Alliance Machine Co.

Otis Steel Co., Cleveland, a 10-ton soaking-pit crane, from the Alliance Machine Co.

Colorado Fuel & Iron Co., Denver, Colo., two 20-ton gantry cranes, from the Alliance Machine Co.

Central Alloy Steel Corporation, Canton, Ohio, a 30-ton trolley, from the Alliance Machine Co.

Gulf States Steel Co., Birmingham, a 10-ton electric traveling crane from the Alliance Machine Co.

Interstate Iron & Steel Co., Chicago, a 5-ton, open-hearth charging crane from the Alliance Machine Co.

National Tube Co., Pittsburgh, four 20-ton, 4-hook, pipe handling overhead cranes from the Morgan Engineering Co. and one 60-ton, two 15-ton standard and one 15-ton, 4-hook overhead cranes from the Alliance Machine Co.

Mosher Steel & Machinery Co., Dallas, Tex., two used 10-ton, 30-ft. span Whiting overhead traveling cranes from F. H. Crawford & Co., 30 Church Street, New York.

Page & Hill Co., Minneapolis, Minn., a 20-ton locomotive crane from the Browning Crane Co.

Pittsburgh

PITTSBURGH, June 13.

DEMAND for machine tools and machinery in this market is steady, although not particularly active, sales running entirely to single items. No lists have reached the trade lately and the report that the Westinghouse Electric & Mfg. Co. had issued its list of third quarter requirements proves to have been premature. In the heavier lines, there is only a fair amount of activity in cranes and new rolling mill business is rather slow. The National Tube Co., however, is expected to place shortly the mill for rolling tube rounds for its new seamless pipe unit at Lorain, Ohio, and manufacturers also are interested in the proposed expansion of the St. Louis Coke & Iron Corporation, Granite City, Ill., and its entrance into the steel business.

Plans have been completed by the Rodgers Sand Co., 1 Wood Street, Pittsburgh, for a one and two-story and basement sand and gravel handling and storage plant, with conveying, unloading and other machinery, to cost \$250,000 with equipment.

The Nilco Lamp Co., Emporium, Pa., manufacturer of incandescent lamps, has plans under way for a new two-story plant at St. Marys, Pa., for which it is expected to ask bids on a general contract in July. It is estimated to cost about \$60,000. R. W. Roloff is general manager.

Following its recent purchase of the property of the Keystone Bronze Co., Foster and Thirty-ninth Streets, Pittsburgh, the National Bearing Metals Corporation has purchased property of the Bronze Metal Co., same city, 200 x 291 ft., as well as about 2½ acres of land of the company at Meadville, Pa. Plans for extensive operations are under way by the purchaser.

The Adamston Flat Glass Co., Clarksburg, W. Va., recently organized to take over a local sheet glass plant, has begun the construction of a new unit for the production of flat drawn sheet glass, to cost about \$200,000 with equipment. W. M. B. Sine is general manager.

The Pittsburgh & Lake Erie Railroad Co., P. & L. E. Terminal Building, Pittsburgh, is said to be planning the installation of a new heavy-duty lathe for wheel-turning.

The Board of Education, Casey, Ill., has plans for a new two-story manual arts school, 126 x 145 ft., to cost more than \$100,000 with equipment. A portion of the structure will be given over to a gymnasium. F. E. Berger and R. L. Kelley, 304 Lincoln Building, Champaign, Ill., are architects.

The Montgomery Elevator Co., foot of Twentieth Street, Moline, Ill., manufacturer of passenger and freight elevators, will soon take bids on a general contract for a two-story addition, to cost \$60,000 with equipment. Cervin, Horn & Stube, Safety Building, Rock Island, Ill., are architects. A. E. Montgomery is president.

The Producers & Refiners Corporation, Parco, Wyo., operating a petroleum refinery, is said to be planning extensions and improvements in its gasoline refining division, including the installation of cracking and other machinery, estimated to cost more than \$500,000.

The Saint Labres Mission, Ashland, Mont., will soon begin the construction of a new manual training shop unit, 25 x 127 ft., with L extension, to cost about \$40,000, with equipment. Other buildings will be added later. B. Rivens, Miles City, Mont., is architect.

The City Council, Galesburg, Ill., is asking bids until June 27 for pumping machinery, valves and accessory equipment for the municipal waterworks. Pearse, Greeley & Hansen, 6 North Michigan Avenue, Chicago, are engineers.

The Minneapolis Mfg. Co., East Hennepin and Fifth Avenues, S. E., Minneapolis, Minn., will soon begin the erection of a one-story power plant to cost \$50,000. The Pillsbury Engineering Co., 2344 Nicollet Avenue, is engineer.

The Common Council, Tyler, Minn., is considering extensions and improvements in the municipal electric light and power plant, including the installation of additional equipment.

The Morris Paper Mill Co., Morris, Ill., will proceed with a one-story addition on Washington Street, to cost \$55,000, for which general contract has been let to Hansen & Petersen, Joliet, Ill. C. A. Chapman, 9 South Clinton Street, Chicago, is architect.

The Northern Pacific Railroad Co., St. Paul, Minn., has plans maturing for a one-story power house for terminal shop service at Mandan, N. D., with installation to include one 300-hp. and two 200-hp. boilers, stokers, coal and ash-handling machinery, etc., to cost in excess of \$75,000.

The Crested Butte School District, Crested Butte, Colo., is considering the installation of manual training equipment in a new three-story high school to cost \$100,000. John J. Huddart, Bank Building, Denver, Colo., is architect.

R. K. Russell, Pennsylvania Avenue and Liberty Street, Warren, Pa., and associates are considering the erection of a three-story automobile service, repair and garage building at Pennsylvania Avenue and Laurel Street, reported to cost about \$100,000, with equipment.

The Penn Central Light & Power Co., Altoona, Pa., has work under way on a new artificial gas plant at Lewistown, Pa., to cost approximately \$500,000 with machinery, including boiler equipment, etc.

The Pittsburgh Screw & Bolt Corporation, Pittsburgh, has been organized under State laws to take over and expand the plants and businesses of the Pittsburgh Screw & Bolt Co., Preble Avenue, and the Gary Screw & Bolt Co., Gary, Ind. The new company will continue operations at the two plants and will operate a third works at Chicago, giving a total floor space for the three mills of 731,570 sq. ft. It is purposed to increase the production facilities. William G. Costin is chairman of the board.

Oliver Korb, North Brady Street, Du Bois, Pa., will ask bids soon on revised plans for a one-story marble plant, to cost in excess of \$40,000 with equipment. W. H. Overdorf, 23 West Long Street, is architect. Bids received on a former call have been rejected.

The Blaw-Knox Co., Blawnox, Pa., manufacturer of steel buildings, steel bins, etc., will soon begin the erection of a one-story addition, 100 x 115 ft., to cost close to \$45,000 with equipment.

The C. O. Bartlett & Snow Co., Cleveland, manufacturer of elevators, conveyors, dryers and handling equipment, has opened a new district office at 406 Bessemer Building, Pittsburgh. W. C. Schade is in charge.

The Keystone Automatic Appliance Co., Rochester, Pa., has been reorganized under the name of the Penn-Monaca Steel Products Co., and is now located at 1746 Pennsylvania Avenue, Monaca, Pa. The company will continue the manufacture of a one man spacing table and also do a general line of structural work.

Philadelphia

PHILADELPHIA, June 13.

THE Whittaker Battery Supply Co., Kansas City, Mo., has arranged for the erection of a new factory branch at Hunting Park and Wissahickon Avenue, Philadelphia, totaling about 10,000 sq. ft. of floor space, to cost about \$35,000.

John G. Mahon, 4910 North Fairhill Street, Philadelphia, manufacturer of roofing products, has plans for a new two-story plant, 23 x 60 ft.

Isaac W. Massey, Thomas Avenue, Philadelphia, contractor, has an award for a one-story automobile service, repair and garage building, 100 x 190 ft., on Forty-third Street, to cost \$75,000 with equipment.

Wolf Brothers, Twelfth and Callowhill Streets, Philadelphia, manufacturers of paper goods, have taken bids for extensions and improvements in a four-story and basement factory, 95 x 135 ft., to cost about \$50,000. Percival M. Sax, Penfield Building, is architect.

The Department of Public Works, Bureau of Water, City Hall, Philadelphia, is asking bids until June 21 for motor drives for Cox stokers at the Queen Lane pumping station, contract No. 885. George H. Biles is director.

The Quaker City Iron Works, Tioga and Richmond Streets, Philadelphia, has taken out a permit for the erection of a one-story boiler plant to cost about \$25,000.

The Crescent Box Co., Erie Avenue and D Street, Philadelphia, manufacturer of cardboard containers, folding boxes, etc., has awarded a general contract to Barclay White & Co., 1713 Sansom Street, for a two-story addition, 80 x 300 ft., to cost approximately \$100,000 with equipment. The Ballinger Co., Twelfth and Chestnut Streets, is architect and engineer.

The New Jersey Power & Light Co., Dover, N. J., operated by the General Gas & Electric Corporation, 50 Pine Street, New York, will begin the construction of a new steam-operated electric generating plant on the Delaware River at Holland, N. J., with initial unit to develop a capacity of 40,000 kw. Later the capacity will be increased to more than 200,000 kw. A transmission line will be built. The project will cost more than \$3,000,000.

The plant and equipment of the McCaffrey File Co., 1831-39 North Fifth Street, Philadelphia, now in receivership, will be offered for sale by Michael J. Ryan, receiver, on June 21, as a going concern. The plant is equipped for a daily output of 500 dozen files.

The William F. Remppis Co., Lemon and Chestnut Streets, Reading, Pa., manufacturer of ornamental iron and steel products, has plans under way for rebuilding the portion of its plant recently destroyed by fire. It will be one and two-stories and will cost more than \$75,000 with equipment.

The Kimble Glass Co., Vineland, N. J., is reported to be planning the construction of an addition to cost more than \$50,000 with equipment. The W. P. Cameron Engineering Co., Packard Building, Philadelphia, is engineer. Herman Kimble is president. The company specializes in the production of turn mold ware, laboratory glassware, etc.

The Board of Education, Mays Landing, N. J., contemplates the installation of manual training equipment in a new three-story high school to cost \$250,000, for which plans will be drawn by S. Hudson Vaughn, Guarantee Trust Building, Atlantic City, N. J., architect.

The Uniform Products Co., Lancaster, Pa., recently organized to take over the Conestoga By-Products Co., manufacturer of fertilizers, etc., with local plant, and the George W. Helme Co., 111 Fifth Avenue, New York, will consolidate and expand the interests. The new company has leased the plant formerly occupied by the Rowe Motor Mfg. Co., Rossmere, Lancaster, and will install machinery to double the capacity of the present factory of the Conestoga company, with cost reported in excess of \$70,000. It is purposed to have the new plant ready for service in October.

H. C. Hodgins and A. D. Hill, 130 South Fifteenth Street, Philadelphia, associated architects, have plans for a three-story automobile service, repair and garage building at Upper Darby, to cost in excess of \$150,000.

The T. H. Ledden Mfg. Co., Ridgway, Pa., manufacturer of incinerators and sheet metal products, has been reorganized and incorporated under the name of the Ledden Incinerator Co. T. H. Ledden is president of the new company.

Cleveland

CLEVELAND, June 13.

SOME machinery dealers and manufacturers report a slight improvement in inquiring for single machines. Sales, however, during the week were very light. While business is coming out this month at about the same rate as during May, there are some expectations that the total volume for the month will show up slightly better than last month. Aside from a list from the Cleveland Board of Education, previously reported, and which is still pending, no inquiries of any size are in the market. A list from the Missouri Pacific Railroad includes two or three turret lathes on which a Cleveland manufacturer is quoting.

The East Shore Machine Products Co., 835 East 140th Street, Cleveland, has awarded contract for an addition, 60 x 104 ft., at an estimated cost of \$40,000.

The Clyde Castings Co., Clyde, Ohio, plans the erection of a building, 40 x 200 ft. Fred Whitcomb is president.

The plants of the Hadfield-Penfield Steel Co., Bucyrus, Mansfield and Willoughby, Ohio, have been sold under receivership to the National Surety Co., New York. The sale is subject to confirmation by the Federal Court. The plants were sold to satisfy claims of the United States Government for advances made during the war.

The Amiesite Asphalt Co. of Ohio, Inc., Arcade Building, Cleveland, has plans under way for a new plant for the production of amiesite asphalt at Mimms, vicinity of Nashville, Tenn., where quarry property has been acquired. The initial unit will be equipped for a capacity of about 400 tons per day and is estimated to cost approximately \$75,000. The company is also planning for the construction of similar refining plants in the Memphis and Nashville districts. The entire project will cost upward of \$200,000 with machinery.

The Berger Mfg. Co., Belden Avenue, Canton, Ohio, is reported to be preparing plans for a one-story addition to replace the portion of its plant destroyed by fire several weeks ago, estimated to cost close to \$100,000 with equipment.

The East Shore Machine Products Co., 835 East 140th Street, Cleveland, has awarded a general contract to J. Reuss & Sons, Lloyd Road, for a one-story addition, 60 x 100 ft., to cost approximately \$50,000 with equipment.

The Ohio Electric Power Co., Oberlin, Ohio, has arranged for a bond issue of \$2,100,000, a portion of the proceeds to be used for expansion and betterments in plants and system. Harry Reid is president.

The Smith Incubator Co., 1930 West Seventy-seventh Street, Cleveland, has awarded a general contract to the Dresser Co., Arcade Building, for a new one and two-story plant, 200 x 270 ft., to cost \$135,000 with equipment. S. B. Smith is president.

M. Aultshuld, 5116 Woodland Avenue, Cleveland, architect, has plans under way for a one-story automobile service, repair and garage building, 100 x 145 ft., to cost about \$100,000 with equipment.

The Board of Education, Bellevue, Ohio, contemplates the installation of manual training equipment in a new two-story high school to cost \$225,000, for which bids will be asked on a general contract before the close of the month. George Millot, Bliss Building, Sandusky, Ohio, is architect.

The Great Lakes Paper Box Co., 1729 Superior Avenue, Cleveland, will soon begin the erection of a four-story and basement plant, 90 x 120 ft., to cost approximately \$140,000 with equipment.

Buffalo

BUFFALO, June 13.

BIDS will be asked during June by the J. P. Danielson Co., Inc., 583 Allen Street, Jamestown, N. Y., manufacturer of wrenches, etc., for a one and two-story addition to cost approximately \$55,000. O. R. Johnson, Fenton Building, is architect. A. H. Swanson is secretary.

John Marion, Ithaca, N. Y., is considering the rebuilding of the portion of his cold storage and refrigerating plant at Interlaken, N. Y., destroyed by fire June 7, with loss reported at \$25,000.

The Superintendent of Purchase, Capitol Building, Albany, N. Y., is asking bids until June 23 for boilers and other equipment for the New York State Woman's Relief Corps institution at Oxford. Plans and specifications at the office of the State Architect, Capitol Building, Albany.

The Board of Education, Johnson City, N. Y., plans the installation of manual training equipment in a new three-story high school addition, to cost \$500,000. Edward Vossbury, Savings Bank Building, Binghamton, N. Y., is architect.

Power equipment, conveying, elevating and other machinery, will be installed in the new printing and publishing plant, 120 x 145 ft., to be erected by the *Syracuse Herald*, Syracuse, N. Y., to cost more than \$250,000 with machinery. Monks & Johnson, 99 Chauncy Street, Boston, are architects and engineers.

The Syracuse Lighting Co., Syracuse, N. Y., plans extensions and improvements in the vicinity of Otisco, N. Y., including transmission line construction.

The Municipal Commission, Mohawk, N. Y., is asking bids until June 22 for equipment for extensions and improvements in the municipal waterworks. Charles C. Hopkins, Cutler Building, Rochester, is engineer.

The Board of Education, Rochester, N. Y., is considering the installation of manual training equipment in a new high school to be known as the Benjamin Franklin High School, estimated to cost \$1,750,000. Gordon & Kaelber, Hiram Sibley Building, are architects.

Milwaukee

MILWAUKEE, June 13.

NEW business is developing slowly for manufacturers of machine tools and while inquiry is of moderate proportions, buyers are hesitant about closing orders. Production is well maintained, although probably at a considerably lower level than a year ago. Skilled machinists are in demand by machine shops generally, but employment reports mention tool builders as a possible exception to this rule. The situation is far from discouraging, however, although a relatively quiet summer is in prospect.

The Leyse Aluminum Co., Kewaunee, Wis., manufacturer of aluminum stampings, utensils, novelties, etc., has awarded a general contract to the H. J. Selmer Co., Green Bay, Wis., for the construction of a two-story manufacturing addition, 56 x 101 ft. Albert Leyse is general manager.

The Universal Vibrating Screen Co., Racine, Wis., has been incorporated with an initial capitalization of \$12,000 to manufacture vibrating screens for handling stone, gravel, clay, coal and other aggregates. It succeeds a partnership business conducted during the past year by Alfred L. Adrianson, A. L. Bengston and G. W. Lenzie. Expansion of production will be undertaken at once.

The D. Miller Scrap Iron Co., 1109 Main Street, Green Bay, Wis., has incorporated its waste materials and refining business under the same name with \$10,000 capital. The principals are M. Miller, E. L. Everson and Lynn D. Joseph, attorney, all of Green Bay.

The Rundle Mfg. Co., Twenty-seventh and Cleveland Avenues, Milwaukee, manufacturer of plumbers' materials, bathroom fixtures, etc., has engaged Charles A. Cahill & Son, consulting engineers, 217 West Water Street, to design alterations in and additions to the plant and power house. The work will cost in excess of \$65,000.

The International Harvester Co., 606 North Michigan Avenue, Chicago, expects to be ready for bids June 24 for the construction of a new headquarters building, 100 x 150 ft., to house its sales and service branch at Eau Claire, Wis., A. B. Clancy, manager. With equipment, the plant will cost about \$85,000.

The Board of Vocational Education, Green Bay, Wis., Harvey Stewart, secretary, will take bids about July 15 for the construction of a new three-story industrial training school, 150 x 120 ft., designed by Foeller & Schober, local architects. About \$300,000 is available for the project.

The Belle City Electric Co., Racine, Wis., has been incorporated to manufacture labor-saving devices and appliances with fractional horse power motors. A factory is being established at 1533 Flett Avenue. The principals are William Driver and Lawrence J. Bleneman.

The Milwaukee Sewerage Commission, J. H. Fowles, secretary, will close bids June 24 for the construction and installation of a complete coal handling plant in the dryer house of the sewage disposal plant on Jones Island.

The National Gauge & Equipment Co., LaCrosse, Wis., division of the MotoMeter Co., Long Island City, N. Y., has let the complete contract to F. R. Schwalbe & Sons, local, for the construction of a one-story addition, 130 x 135 ft., and a new two-story administration building, 70 x 160 ft.

The Village Board of Shorewood, Milwaukee P. O., Wis., has engaged H. C. Hengels, architect, 445 Milwaukee Street, Milwaukee, to plan a municipal garbage incinerating plant costing about \$30,000, and an adjacent shop and warehouse building for all municipal owned machinery and equipment. H. A. Schmitt is village engineer.

The Board of Education, Neenah, Wis., Mrs. J. F. Gillingham, secretary, expects to be ready soon for bids for the construction of a combination high and vocational training school, designed by John D. Chubb, architect, 109 North Dearborn Street, Chicago. It will cost about \$300,000.

The Twin City Packing Co., 210 Bellevue Avenue, Menominee, Mich., has placed the general contract with C. H. Danielson, Peshtigo, Wis., for the construction of a \$100,000 packing house and power plant, designed by Kamrath & Christiansen, 111 West Jackson Boulevard, Chicago. The main building will be 100 x 186 ft., two and three stories, with four auxiliary buildings. Louis Kreuz is general manager.

Herbert Hamilton has purchased property at the corner of Main and South Pine Streets, Reedsburg, Wis., and will open a general machine and repair shop.

St. Louis

ST. LOUIS, June 13.

CONTRACT has been let by the Superior Enamel Products Co., 1546 North Tenth Street, St. Louis, to the William H. and Nelson Cunliff Co., 410 North Euclid Street, for a one-story plant, 90 x 140 ft., to cost approximately \$25,000 with equipment. The latter will include electrically-operated enameling ovens and kindred apparatus.

The Vesper Buick Automobile Co., Grand and Lindell Streets, St. Louis, representative for the Buick automobile, has revised plans under way for a two-story addition to its service, repair and sales building to cost \$100,000. Improvements will be made also in the present structure. Preston J. Bradshaw, International Life Building, is architect.

The Arnold Iron & Steel Mills, Inc., Oklahoma City, Okla., has acquired property at Bristow, Okla., for a branch plant, and will soon install equipment for the production of steel wagon tires, railroad spikes, bars and kindred products. A steel fabricating works is also proposed. The entire project is reported to cost in excess of \$85,000.

The St. Louis County Water Co., 6600 Delmar Avenue, St. Louis, has plans under way for a new three-story service and repair shop at University City, with facilities for automobile service and equipment to cost in excess of \$80,000.

The A. B. A. Oil Co., 138 South Thirteenth Street, Lincoln, Neb., will soon break ground for a three-story and basement storage and distributing plant, 82 x 90 ft., to cost about \$80,000.

The Common Council, Wilber, Neb., is considering the installation of a municipal electric light and power plant, to cost approximately \$35,000 with equipment.

Plans are said to be under way for the merger of the More-Jones Brass & Metal Co., Manchester Avenue, St. Louis, manufacturer of bronze bearings, metal castings, etc., with three or more companies in this line of production in different parts of the country, names temporarily withheld. An expansion program will be carried out in the line of journal bearings for car service, and other bronze and brass goods. W. A. Harriman & Co., 26 Broadway, New York, investment securities, are carrying out negotia-

tions for the consolidation. John B. Strauch is president of the More-Jones company.

The Cudahy Packing Co., Kansas City, Kan., with headquarters at 111 West Monroe Street, Chicago, has awarded a general contract to the J. R. Van Sant Construction Co., Dwight Building, Kansas City, for a new six-story rendering plant, 65 x 83 ft., to cost in excess of \$175,000 with equipment.

The Board of Education, Lincoln, Neb., is considering the installation of manual training equipment in a two-story and basement junior high school to cost approximately \$300,000. Davis & Wilson, 525 South Thirteenth Street, are architects.

The Board of Education, Tulsa, Okla., will soon ask bids on general contract for a new vocational school to cost about \$125,000. Leland I. Shumway, New Alexander Building, is architect.

The Board of Works, Topeka, Kan., is planning expansion and improvement in the municipal waterworks, to include the installation of motor-driven pumping equipment. E. T. Archer & Co., New England Building, Kansas City, Mo., are engineers.

The St. Louis Spring Co., 3135 Washington Boulevard, St. Louis, has been organized to manufacture metal springs and kindred metal products. The company has its own plant at St. Louis and branches at San Antonio, Tex., and Denver, Colo.

Gulf States

BIRMINGHAM, June 13.

THE Panhandle Light & Power Co., Abilene, Tex., operated by the Kansas City Power & Light Co., Fourteenth Street and Grand Avenue, Kansas City, Mo., is said to be completing plans for the construction of a new steam-operated electric power plant at Magic City, vicinity of Panhandle, Tex., to cost close to \$100,000 with equipment and transmission line.

The Lone Star Gas Co., 1915 Wood Street, Dallas, Tex., is planning the installation of a natural gas distributing plant at Temple, Tex., with construction of a pipe line from that place to Waco and vicinity. The entire project is reported to cost close to \$1,000,000. The company is disposing of a bond issue of \$15,000,000, a portion of the fund to be used for expansion.

W. M. Smith & Co., Birmingham, machinery dealers, have inquiries out for a milling machine, Cincinnati type preferred; also for two steam hammers, about 800 and 1000 lb. capacity, respectively.

The Southern Advance Bag & Paper Co., Inc., a subsidiary of the Advance Bag & Paper Co., Inc., Middletown, Ohio, has begun the construction of a new paper and pulp mill at Hodge, La., for the manufacture of kraft papers, with an initial output of about 100 tons per day. A bag manufacturing plant will be erected on adjoining site. A portion of the finished paper output will be used by the parent company at its Middletown mills. The company has about 67 acres of timber land in the vicinity of the plant and will install facilities for raw material handling for the Hodge mill. The entire project is reported to cost upward of \$1,500,000. The company is disposing of a bond issue of \$3,000,000, a portion of the fund to be used for the new mill. John E. Kelley is president.

Thomas K. Marbury, Meridian, Miss., and associates are organizing a company with capital of \$100,000, to establish a local plant for the manufacture of electric refrigerating machines and parts.

The Alabama Power Co., Birmingham, is said to be planning a hydroelectric power development at Lock 17, Warrior River, to cost in excess of \$1,000,000 with transmission system.

The Mississippi Gas & Coke Co., Union Indemnity Building, New Orleans, F. S. Mordaunt, president, has approved plans for the immediate construction of a new artificial gas plant at Laurel, Miss., with by-products coke works, to cost about \$500,000 with machinery.

The Texarillo Refining Co., Amarillo, Tex., recently organized by Dorset Carter, head of the Pantex Pipe Line Co., Masse Building, Amarillo, and associates, with capital of \$300,000, is said to have plans under way for a new oil refinery to handle about 5000 bbl. of crude oil per day. It is estimated to cost close to \$225,000 with machinery.

The Orleans Parish School Board, New Orleans, plans the installation of manual training equipment in a new high school, to be known as the Samuel J. Peters Boys' High School of Commerce, to cost close to \$400,000, for which superstructure will soon begin. E. A. Christy, City Hall Annex, is supervising architect for the board.

The Jacksonville Gas Co., Jacksonville, Fla., operating artificial gas works, is disposing of a bond issue of \$1,500,000, a portion of the fund to be used for extensions and betterments. Roy A. Zeigler is vice-president and general manager.

Shourds & Bean, Bank of Gulfport Building, Gulfport, Miss., architects, have plans for a new two-story automobile service, repair and garage building, 71 x 180 ft., with foundations arranged for three additional floors later.

The Board of Education, Natchez, Miss., contemplates the installation of manual training equipment in a new two-story and basement high school to cost \$250,000, for which bids have been asked on a general contract. P. J. Krouse, M. & W. Building, Meridian, Miss., is architect.

The Birmingham Casket Co., 2701 North Twenty-seventh Street, Birmingham, manufacturer of metallic caskets, etc., is said to be planning the erection of a new two-story branch factory, 150 x 250 ft., at Houston, Tex., to cost close to \$200,000 with equipment.

Detroit

DETROIT, June 13.

THE Carleton Cooler Association, Carleton, Mich., care of R. J. McCormick, cashier, Carleton State Savings Bank, recently formed with a capital of \$200,000, has plans for the establishment of a new plant for the manufacture of iceless refrigerators and equipment, to be known as Zero-Ic. E. F. Kahlbaum, George Egle and S. O. Reeves, all of Carleton, head the company.

Bids have been asked on a general contract by the Cadillac Casket Co., 2370 Wabash Avenue, Detroit, for a two-story addition, including improvements in present factory, to cost \$50,000. Weston & Ellington, Stroh Building, are architects. A. D. Tune is president.

Ovens, power equipment, conveying and other machinery will be installed in the proposed plant to be constructed at Grand Rapids, Mich., by the Taggart Baking Co., Kansas City, Mo., to cost about \$100,000, on which work will soon begin.

The Board of Water Commissioners, 176 East Jefferson Street, Detroit, is asking bids until June 22 for steel water tanks and towers for the municipal water works. Specifications at the office of the board. George H. Fenkell is general manager.

The A. C. Spark Plug Co., Flint, Mich., is said to have completed plans for a new plant unit to cost more than \$250,000 with equipment.

The Board of Education, Monroe, Mich., is planning the installation of manual training equipment in a new three-story high school to cost \$700,000, for which plans will soon be completed by H. H. Turner and V. E. Thebaud, Michigan Trust Building, Grand Rapids, Mich., architects.

The American Malleables Co., Owosso, Mich., has awarded a general contract to Watson & Stevens, Owosso, for an addition at its local plant to cost in excess of \$150,000 with equipment.

The Common Council, Fair Haven, Mich., plans the installation of pumping and power equipment in connection with a proposed municipal waterworks to cost about \$100,000. Ayers, Lewis, Norton & Mays, Ann Arbor, Mich., are engineers.

The Chrysler Corporation, East Jefferson Street, Detroit, has begun the production of marine engines at its plant for motor boat service, to be known as the Chrysler imperial marine engine, and will give over a portion of its works for parts manufacture and assembling in this line.

Cincinnati

CINCINNATI, June 13.

AN improvement in machine tool sales was noted the past week and five leading builders report bookings in the fore part of June slightly ahead of those in the same period in May. The outlook is favorable for the placing of a moderate amount of business before the end of the month. With only a few exceptions current purchases are for replacement.

The export trade momentarily is attracting some attention. Two sizable inquiries, one for seven lathes for a railroad in China and the other for about 10 lathes for delivery to a South American company, are pending. Oil development companies in South America are known to have bought equipment in the last two weeks. Automobile makers are contracting for a small quantity of tools but are not expected to be a large factor in the market through the summer.

The Southern Pacific has placed three lathes, and the New York Central probably will buy five engine lathes. The Wabash Railroad is asking for prices on a 32-in. heavy duty engine lathe and an axle lathe. The United States Navy is considering the purchase of seven lathes for installation on

scout cruisers. The American Locomotive Co. is the buyer of a heavy axle lathe, while the United States Cast Iron Pipe & Foundry Co. has taken a 48-in. x 24-ft. heavy engine lathe.

Contract has been let by the J. H. McGowan Pump Co., Central Avenue, Cincinnati, to the Austin Co., for a new plant at Ironton, Ohio, to cost about \$65,000.

The Department of Public Service, Columbus, has approved recommendations for an addition to the pumping station for the municipal waterworks, to be 140 x 140 ft., with five new pumping units to develop an output of 30,000,000 gal. per day. The expansion will cost \$375,000. Bids will be asked soon. The recommendation includes also the installation of a coal and ash-handling system in the power house.

The De Soto Hardwood Flooring Co., 1044 Sledge Avenue, Memphis, Tenn., has plans for a one-story addition, 65 x 150 ft., to cost about \$25,000, for which a general contract has been let to Silk & Chambers, 63 South Third Street.

The Wheland Co., Inc., Whiteside and Twenty-second Streets, Chattanooga, Tenn., is disposing of a bond issue of \$300,000, a portion of the fund to be used for expansion in production and distribution in the line of pumps and kindred equipment for oilfield service.

The Cincinnati Oil Works Co., Cincinnati, has filed plans for a new three-story storage and distributing plant to cost \$130,000 with equipment. C. C. Wood, Cincinnati, is architect.

The Dempster Equipment Co., Inc., Springdale Avenue, Knoxville, Tenn., has inquiries out for a belt-driven air compressor, with capacity of about 1000 cu. ft. per min.

The Cleveland, Cincinnati, Chicago & St. Louis Railroad, Cincinnati, has awarded a contract to the Blaw-Knox Co., Blawnox, Pa., and the Kuert Construction Co., Cincinnati, for the erection of one-story work shops on Mill Street and for similar shops at 735-43 West Third Street.

The Crescent Washing Machine Division of the Hobart Mfg. Co., formerly at New Rochelle, N. Y., will be located after July 1 at Troy, Ohio.

South Atlantic States

BALTIMORE, June 13.

CONTRACT has been let by the American Piano Co., William Knabe Division, Baltimore, to Thomas Hicks & Sons, 106 West Madison Street, for a one-story factory addition, to cost approximately \$50,000 with equipment. Taylor & Fisher, Union Trust Building, are architects.

The Consolidated Gas, Electric Light & Power Co., Lexington Building, Baltimore, has plans for a one-story addition to its plant on Gould Street, 57 x 100 ft., to cost \$150,000 with equipment.

The R. S. Armstrong & Brother Co., 676 Marietta Street, N.W., Atlanta, Ga., machinery dealer, is in the market for industrial motors, including a 75-hp., 60-cycle, 3-phase motor.

The Town Council, Newark, Del., is asking bids until June 22 for a sewage pumping station in connection with extensions and improvements in the system. E. B. Frazer is president.

Bids will be asked at once by the Board of Trustees, Maryland Training School for Boys, Loch Raven, Md., for a one-story central power plant in conjunction with mechanical laundry. The entire project will cost about \$130,000. Henry P. Hopkins and Allen Burton, 347 North Charles Street, Baltimore, are associated architects. Henry Adams, Calvert Building, Baltimore, is mechanical engineer.

James R. Connelly, Florence, S. C., is inquiring for a deep well turbine pump.

The Board of District Commissioners, District Building, Washington, is asking bids until June 20 for 1500 water meters.

The National Land Exchange, Inc., Elizabethtown, N. C., is considering the purchase of a steam shovel, revolving type.

The Board of Trustees, Clemson College, Clemson College, S. C., has awarded a general contract to C. M. Guest, Anderson, S. C., for a three-story and basement building, 113 x 175 ft., for the department of engineering and architecture, to cost \$250,000 with equipment. Rudolph E. Lee, Clemson College, is architect. Dr. E. W. Sikes is president.

The Eastern Shore Gas & Electric Co., Salisbury, Md., through its subsidiary, the Delmarva Power Co., has begun the construction of its new steam-operated electric generating plant at Vienna, Md., with initial installation to consist of a 6000-kw. turbo-generator, boilers and auxiliary equipment. Other units will be installed at an early date. The entire project is estimated to cost close to \$2,000,000, including transmission lines. Day & Zimmerman, Inc., Sixteenth and Walnut Streets, Philadelphia, is engineer and contractor.

The Board of Education, Asheville, N. C., is considering

the installation of manual training equipment in a new senior high school to cost \$700,000, for which superstructure will soon begin. Douglas G. Ellington, Asheville, is architect.

The Board of Public Works, Richmond, Va., has acquired a tract of about 100 acres near Severn Pines, and plans the establishment of a municipal airport, including shops, hangars, etc.

The Barnum Bruns Iron Works, Inc., 328 West Twenty-fourth Street, Norfolk, Va., has been organized to fabricate structural steel and do ornamental iron, wire and brass work. The company is building a small plant and is buying materials and equipment.

Indiana

INDIANAPOLIS, June 13.

THE Cleveland, Cincinnati, Chicago & St. Louis Railroad Co., Big Four Building, Cincinnati, has plans under way for a new engine house with shop facilities at South Anderson, Ind., to cost about \$190,000 with equipment. It is understood that bids will be asked on a general contract about the middle of July. H. A. Baldwin is chief engineer.

The City Council, Bloomington, Ind., is asking bids until July 7 for a pumping plant for the municipal waterworks, in connection with a filtration station, for which bids will be received at the same time, with capacity of 2,000,000 gal. per day. The installation is estimated to cost \$100,000. Pearce, Greeley & Hansen, 6 North Michigan Avenue, Chicago, are engineers.

The Indiana Service Corporation, Huntington, Ind., is considering rebuilding the portion of its car barns and shop destroyed by fire June 4, with loss reported at \$35,000 including equipment.

The Board of School Trustees, Lafayette, Ind., plans the installation of a manual training department in an addition to be erected at the Fairfield Township school, to cost close to \$100,000 with equipment, for which bids have been asked on a general contract. Walter Scholer, Painters' & Decorators' Building, Lafayette, is architect.

Pride Brothers, 102 South Third Street, Evansville, Ind., automobile dealers, are considering the erection of a three-story and basement service, repair and garage building, 50 x 100 ft., to cost about \$90,000 with equipment.

The Sturdy Mfg. Co., 41 Commercial Street, Newark, N. J., manufacturer of copper oil reservoirs for electrical apparatus, metallic bellows, and other electro-mechanical equipment, has leased a portion of the former plant of the Mid-West Engine Co., Indianapolis, totaling about 10,000 sq. ft. of floor space, and will occupy for a new plant. The present business will be removed from Newark and additional equipment installed. I. W. Masters is head.

The Evansville Malleable Castings Co., Evansville, Ind., a new corporation capitalized at \$100,000, has purchased at a receiver's sale the Berryhill Malleable Iron Co., local, for the manufacture of malleable castings. A. S. Anderson is general manager.

The Cook Brothers, Winchester, Ind., are having ground cleared for the erection of a foundry.

Pacific Coast

SAN FRANCISCO, June 8.

THE Los Angeles Pipe & Supply Co., Los Angeles, has acquired about two acres in the Laguna-Maywood industrial district as a site for a new plant, estimated to cost about \$180,000 with equipment.

John L. McNab, 703 Market Street, San Francisco, is at the head of a project to construct a hydroelectric generating plant in the French Meadows district of Placer County, with initial capacity of 75,000 hp., to cost in excess of \$5,000,000 with transmission system.

Reed & Corlett, Oakland Bank of Savings Building, Oakland, Cal., architect, has plans for a four-story automobile service, repair and garage building to cost approximately \$150,000 with equipment.

The Union Oil Co., Union Oil Building, Los Angeles, plans the rebuilding of the portion of its refinery in the Los Angeles Harbor district, destroyed by fire June 8, with loss reported at \$100,000 including equipment. The bulk of the damage was sustained by the gas agitator department.

The Globe Grain & Mill Co., Ogden, Utah, has completed plans for an addition to its flour mill and grain milling plant, including a battery of 20 grain tanks, to cost about \$450,000 with equipment.

The Grays Harbor Railway & Light Co., Aberdeen, Wash., is considering extensions and improvements in its local steam-operated electric power plant, to cost more than \$500,000 with machinery.

The Boeing Airplane Transport Co., Seattle, has awarded a general contract to the Austin Co., for a hangar and shop facilities at Chicago, to be used in connection with an aerial transport line to cost \$45,000.

The Illinois-Pacific Glass Co., Fifteenth and Folsom Streets, San Francisco, manufacturer of bottles, etc., is completing plans for a new multi-story plant at Los Angeles, estimated to cost in excess of \$500,000 with equipment.

The National Orchard Heater Co., Covina, Cal., has plans for a one-story works, 100 x 120 ft. A. W. Feist, Covina, is architect.

The Huntington Park Union High School District, Huntington Park, Cal., has plans for a new manual shop in connection with several buildings to be erected at the high school to cost approximately \$200,000. George M. Lindsey, Union Insurance Building, Los Angeles, is architect.

The Board of City Trustees, Santa Maria, Cal., is planning the installation of a pumping plant in connection with extensions in the municipal water system for soft water supply. A bond issue of \$65,000 has been approved.

The Board of Water Commissioners, Eugene, Ore., is planning for enlargements in the municipal hydroelectric generating plant to more than quadruple the present capacity, developing a total of 18,000 hp. The project will include a 30-mile transmission line and is estimated to cost \$3,000,000, including a diversion dam on the McKenzie River. A fund of \$750,000 is available by the present plant and a special election will be held June 28 to approve bonds in amount of \$2,250,000. J. W. McArthur is chief engineer.

The Hydraulic Supply Mfg. Co., Seattle, has received an order for five steel tanks, 20 ft. in diameter and 25 ft. high, for shipment to the Northwestern Portland Cement Co., Portland. It is completing a shipment of 10 tanks, 11 ft. 6-in. in diameter and 32 ft. 7-in. high, to the Shell Oil Co. of California.

The Smith & Watson Iron Works, Portland, has increased its capital stock from \$100,000 to \$500,000, and will make additions to its plant.

The Northwestern Metalware Co., Portland, Ore., on June 1 moved into a new two-story factory building, 60 x 180 ft.

The Hofus Steel & Equipment Co., Seattle, Wash., has been appointed representative in the State of Washington and adjacent territory for the Hyman-Michaels Co., Chicago, dealer in new and relaying rails, logging and railroad equipment and heavy machinery.

Canada

TORONTO, June 13.

WHILE the general trend of machine tool business in this market shows little change, orders placed by Canadian railroads the first few days of this month and several smaller lists from other sources have materially added to bookings of builders and dealers. Current business is chiefly in single tools, the majority for replacement needs. Good sized lists are expected from the Oshawa, Ont., automotive industry in connection with plant additions now under construction.

Dealers handling both iron and wood-working tools report improvement in sales over those of a year ago, while rebuilt tools are also in good demand. The mining industry of Canada, which has been a big purchaser of machinery and tools, has issued further lists of requirements.

Thomas Foster, chairman of the Board of Control, Toronto, will receive bids until July 12 for one 750 Imperial gal. per min. centrifugal pump, electric motor, etc. Plans and specifications at the Department of Works, room 12, City Hall.

The Rock Mfg. Co., Preston, Ont., has awarded a general contract to the Frid Construction Co., Clyde Building, Hamilton, Ont., for a \$70,000 addition to its plant. Warren & McDonnell, 72 James Street, Hamilton, are architects.

T. Gingras, 459 Adelaide Street West, Toronto, is having plans prepared for the erection of a foundry. Equipment has not been purchased.

The Power Corporation of Canada, Ltd., 20 St. Nicholas Street, Montreal, has been appointed engineers for the \$4,000,000 paper mill to be built between Deschenes and Alymer, Que., for Nesbitt, Thompson & Co., Ltd., 145 St. James Street, Montreal.

Bids will be called soon by Frederick W. Cowie, engineer, 191 The Boulevard, Montreal, for the construction of a cold storage plant at Halifax, N. S., to cost approximately \$2,500,000 including equipment, for the Nova Scotia Public Fish & Cold Storage Terminals, Ltd., care of V. M. Drury & Co., 189 St. James Street, Montreal.

The ratepayers of Hull, Que., have carried a by-law authorizing the expenditure of \$65,000 on a waterworks plant. Theodore Lanctot is city engineer.

Bids are being called for for the erection of an addition to the factory of London Shipping Containers, Ltd., London, Ont., to cost \$50,000. John Moore & Co. are architects.

Orders for equipment for a 100-ton pilot mill will be placed shortly by the Errington Mines in the Chelmsford district, Cobalt, Ont. It is proposed to build a larger mill later.

The plant of the Parry Sound, Ont., Wood Turner Co. was partly destroyed by fire June 9 with a loss estimated at \$20,000. It will be rebuilt and some new tools will be required.

Foreign

THE Société Anonyme André Citroën, Paris, France, manufacturer of small popular-priced automobiles, has arranged for the sale of a preferred stock issue to provide additional capital in an amount of close to \$8,000,000, a portion of the fund to be used for expansion and betterments.

The Municipal Government, Genoa, Italy, is said to be planning the installation of traveling cranes, conveying machinery and other handling equipment in connection with the construction of large docks in the harbor for freight and coal vessels. Information at the office of the Bureau of Foreign and Domestic Commerce, Washington, reference 244139; also, at the American Consulate, Genoa, Julian C. Dorr, vice-consul.

The Société Anonyme Radio, Belgrade, Yugoslavia, is being organized to construct and operate a number of high-power radio broadcasting and receiving stations, to be designated by the Ministry of Posts and Telegraph. The American Consulate, Belgrade, S. E. McMillan, consul, has information regarding the project.

The Tokyo Electric Co., Tokyo, Japan, an interest of the Edison Lamp Works Division of the General Electric Co., Schenectady, N. Y., has plans for the initial unit of a new plant at Kawasaki, Japan, to be three stories, 180 x 400 ft., for which a general contract recently was let to the H. K. Ferguson Co., Cleveland.

The Government of Spain, Madrid, has granted a concession for the construction of a railroad from Alicante to Alcoy, for which a budget of \$5,301,000 has been arranged. It is proposed to begin work soon. The company securing the concession is interested in hearing from American concerns in position to furnish machinery and equipment for railroad construction. Information at the office of the Bureau of Foreign and Domestic Commerce, Washington, reference Spain No. 35X. Also, at the American Consulate, Madrid, Charles H. Cunningham, commercial attaché.

The Victorian Government Railways, Melbourne, Australia, is asking tenders until July 17 for one 30-ton overhead electric traveling crane.

Announcement that the Koppers Co., Pittsburgh, has consolidated several coke producing units into a single subsidiary unit comes with the public offering of \$25,000,000 of 20-year 5 per cent debenture bonds of the Koppers Gas & Coke Co. The Seaboard By-Product Coke Co., Kearney, N. J.; the Minnesota By-Products Coke Co., St. Paul; the Chicago By-Products Coke Co., Chicago; and the Milwaukee Coke & Gas Co., Milwaukee, are the companies which make up the Koppers Gas & Coke Co., along with the public utilities companies owned by the Koppers Co.

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